GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified
COMPASS CORD Transmission Belting
A
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C
A. Cord-covering envelope of tough, elastic fabric, resists wear.
B. Multi-strand cords laid in a single plane carry the load. Cords on opposite sides of belt axis are twisted in opposite directions to insure true running.
C. Thinner cross-section permits longer life over smaller pulleys.

1200% more life

from wire-winding belts

ONCE steel wire is drawn, it must be wound on spools. This is done on special machines with the help of short, endless belts.

Previously used belts lasted only six weeks. Excessive oil, severe abrasion, short centers and high speed were the reasons for such short life. The G.T.M.—Goodyear Technical Man—was consulted. He suggested COMPASS CORD Transmission Belts (see blueprint) with oil-resistant top covers.

RESULT: These endless cord belts *cost less than half* of those formerly used—*last an average of 18 months*—cut down-time and maintenance costs inestimably.

How can the G.T.M. and COMPASS CORD Transmission Belts cut your drive costs? Find out by contacting him, your Goodyear Distributor or writing Goodyear, Industrial Products Division, Akron 16, Ohio.

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

COMPASS CORD TRANSMISSION BELTS by

GOODYEAR

THE GREATEST NAME IN RUBBER

Compass—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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'ROUND ABOUT with the editors in field and office

Edited by R. L. Marinello

Takes Over New Position

Paul E. Barley has been appointed superintendent of maintenance at the Ambridge plant of A. M. Byers Co. Responsibilities of the position — a newly created post—include the coordination of the plant's mechanical, electrical and masonry departments.

He was previously employed by the A. M. Byers Co. for 19 years until 1952, when he accepted the position of superintendent of construction and maintenance for the Green River Steel Corp. at the construction of that company's new plant at Owensboro, Ky.

Plant Engineers Promoted

Francis E. Weisend has been named plant manager of The B. F. Goodrich Co. Plastics Products Division plant at Marietta, Ohio.

He joined the company in 1938 as an engineer in the physical testing laboratory in Akron. He later became an instrument engineer at the Akron plant in 1939 and, in 1948, was named power engineer at the company's Oaks, Pa., tire manufacturing plant. In 1953, Mr. Weisend became plant engineer at the Marietta plant.

Carl J. Snyder, plant engineer at the Fairmont, West Virginia, plant of Owens-Illinois Glass Co., was transferred recently to the company's general offices in Toledo, Ohio.

He has been with the company since 1940. In his new position, he will be responsible for coordinating and administering major construction contracts and the purchasing functions related to the company's major construction program.

George A. Gentes was appointed assistant works manager and **Robert M. Sherwin** was appointed assistant plant engineer of the Tacoma, Washington, plant of the Hooker Electrochemical Co.

Mr. Gentes joined the firm's engineering department at the Niagara Falls, N. Y., plant in 1941. He was transferred to Tacoma in 1949 and was named plant engineer in 1951. Mr. Sherwin joined the company as a chemical engineer in 1951.

PE Editor Attends Forum

APPROXIMATELY two hundred people from industry attended the Productive Maintenance Forum in St. Louis, Missouri recently. This instructive and helpful session was one of over 20 that have been presented by General Electric Co. in various cities throughout the United States.

With aid of a color film and slides, the persons attending this educational forum were told how to improve and reduce costs through better maintenance control, parts storage, and work scheduling.

Some of the items that were given consideration during the conference were: paperwork for controlled maintenance, evaluation of critical and routine maintenance, and the establishment of a critical maintenance program.

Associate Editor, E. B. Skubik, is flanked by G.E. personnel, l to r: H. D. Beale, Mgr. Systems Spare Parts Sales; R. G. Rettig, Mgr. St. Louis Service Shops; H. F. McCullough, Gen. Mgr. Service Shops Dept.; and L. E. Clover, Mgr. Plant Engineering-Maintenance

Conferences and Shows in 1956

FIRST TO LEAD the list of shows and conferences planned in 1956 is the Plant Maintenance and Engineering Show and Conference. It will be held at Convention Hall, Philadelphia from January 23 to January 26. Plant engineers who plan to attend and would like to include the American Institute of Plant Engineers' luncheon on their schedule should fill in the reservation coupon appearing in this issue. The luncheon will be held on Tuesday, January 24.

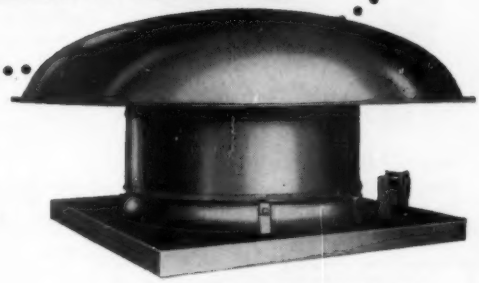
The Fifth Annual Industrial Ventilation Conference will be held at Kellogg Center, Michigan State University on February 6 to February 9. It will be identical in nature with the earlier meetings, covering informal talks on hoods, duct systems and fans, together with actual classroom problems which call upon the participant to design exhaust systems. More information on this conference may be obtained by writing to the University or to James C. Barrett, Ventilation Engineer, the Division of Oc-

Subscriptions: U.S.A. $10, Canada $11. Other countries $12 per year. Single copies $1. Change of Address: Send to PLANT ENGINEERING, Circulation Division, Barrington, Illinois. Please supply position title, company name, company address. Request must reach us by 15th of month to make the change effective with following month's issue. Published monthly and accepted as controlled circulation publication at Chicago, Ill.

***For whisper-quiet operation** on schools, hospitals. The all-new Centrifugal Roof Ventilator runs at low speeds, moves large volumes of air efficiently against static pressures.*

***For oil or grease laden air.** The newly redesigned Vertical Discharge Roof Ventilator exhausts air straight up at high velocity. It keeps harmful residue off the roof . . . prolongs roof life.*

3 new LOW-SILHOUETTE ROOF VENTILATORS



The Power-Flow Roof Ventilator is a ruggedly built unit in an aerodynamically correct, weatherproof housing. Most popular of all for general useage.

Low in silhouette . . . distinctively profiled . . . these units blend well with modern architecture. What's more, they deliver all the air you pay for. All performance ratings are the output of the *completely assembled* unit . . . obtained from wind tunnel tests as per Standard Test Code for Power Roof Ventilators . . . conform to U. S. Department of Commerce Standard 178-51. Capacities up to 40,900 CFM. Send for catalogs today.

3 New catalogs

MAIL COUPON TODAY

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A DIVISION OF
American Machine and Metals, Inc.
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Division of American Machine and Metals, Inc.
East Moline, Illinois

Please send catalogs on your following roof ventilators . . .

- ☐ *Centrifugal,* for quiet operation
- ☐ *Vertical Discharge,* for oil or grease laden air
- ☐ *Power-Flow,* for normal industrial air
- ☐ All three ventilators

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ATTENTION MR. _____

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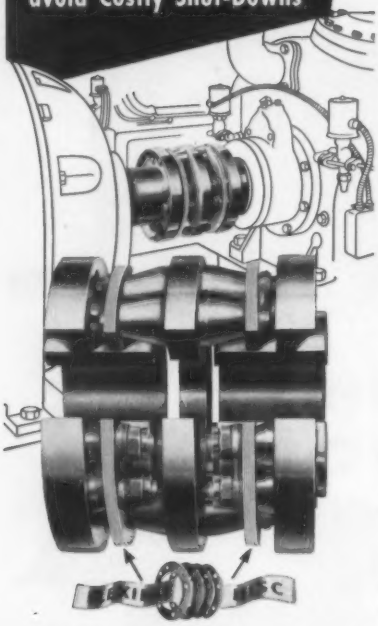
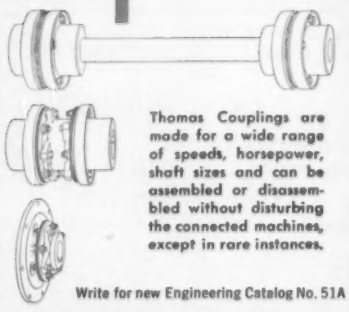
Specify THOMAS ALL METAL
FLEXIBLE COUPLINGS
for Power Transmission to avoid Costly Shut-Downs



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower, shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

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'ROUND ABOUT

pational Health, Lansing 4, Michigan.

Twelfth Annual Meeting of the Metal Powder Association and the 1956 Metal Powder Show will be held in Cleveland at the Hotel Cleveland from April 10 to April 12. The meeting will deal with all aspects of the field of powder metallurgy, with emphasis on manufacture of structural parts from metal powders, self-lubricating bearings, metal powder filters and friction materials, as well as iron powder electronic cores and ferrites. The show will display the latest developments of powder suppliers, manufacturers, etc. Additional information is available from the Metal Powder Association, 420 Lexington Ave., New York 17, N. Y.

The first Design Engineering Show will be held at Convention Hall, Philadelphia, from May 14 to May 17. The exhibit portion of the show will display types of original equipment which go into the manufacture of a finished product. Exhibits will include parts, components, finishes and basic materials, as well as testing machines, X-ray machines and other equipment. To supplement the exhibits, a conference will be conducted at which papers will consider various applications of design engineering theory and practice. More information about this exhibit and conference may be obtained from Clapp and Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Scheduled for June 11 to 15 at the new Coliseum in New York City, the Seventh National Plastics Exposition will give representatives of business and industry a look at all phases of the plastics industry. A technical conference will run concurrently with the show. Further details of this exposition are available from Clapp and Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

"Integrated Handling — Management Profit Tool" will be the theme of the twelve technical sessions sponsored by the American Material Handling Society during the Material Handling Institute's Exposition of 1956 at the Cleveland Auditorium, Cleveland, June 5 to June 7. Write to The Material Handling Institute Inc., Room 759, One Gateway Center, Pittsburgh 22, Pa., for additional details.

Tax Data on Leasing Programs

MANY INDUSTRIAL plants now using leased equipment or contemplating the use of lease equipment, will be interested in the bulletin published recently by the Machinery and Allied Products Institute.

The bulletin covers the three Revenue Rulings 55-540, 55-541 and 55-542.

Readers interested in getting a copy of this bulletin, should address their inquiry to Machinery and Allied Products Institute, 1200 Eighteenth Street, N. W., Washington 6, D. C.

MH Clinic Conducts Panel Discussions in Two Cities

TWENTY-FIVE top executives from material handling manufacturing companies recently conducted a five-panel clinic in Cleveland, Ohio, and then flew to Louisville, Kentucky, that evening to conduct a similar panel in Louisville the next day.

The Traveling Clinic panels discussed: Receiving and Shipping; Equipment Selection, Replacement, Repair and Maintenance; Storage, Warehousing and Yard Handling; Integrating Material Handling with Plant Facilities; and In-Process Handling. Industrial users brought problems and questions to the clinic for panel discussion and solution.

The Traveling Clinics are part of the educational program of The Material Handling Institute, Inc. If you would like to find out when one of these clinics will be in your neighborhood, just send your inquiry to L. West Shea, Secretary, The Material Handling Institute, Inc., Room 759, One Gateway Center, Pittsburgh 22, Pa.

Twenty-five executives from material handling companies, after conducting one-day clinic in Cleveland, enplane for Louisville to conduct similar panel next day

this is "life insurance" for boilers

It's a good "policy" to protect your valuable boilers with YARWAY Boiler Level Indicators.

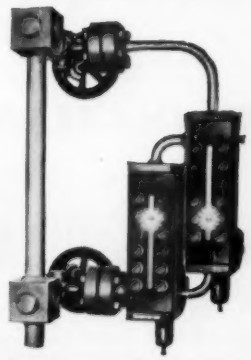
Instant . . . accurate . . . continuous remote readings of boiler water levels are available on the instrument panel or wherever you wish in the plant.

YARWAY's new "wide vision" face gives brilliant readings from any angle . . . and the pointer is always visible, even at extreme high and low water levels.

For brilliant "shines like a star" readings on the boiler drum you'll want to use YARWAY Flat Glass Gages with Type "M" Illuminators.

From drum to panel and at all remote locations, YARWAY equipment gives you the safest boiler protection you can buy—proved beyond doubt in nearly 10,000 installations.

Yarway Remote Liquid Level Indicator. Write for Yarway Bulletin WG-1824.



Yarway Flat Glass Water Gage with Type "M" Illuminators. Write for Yarway Bulletin WG-1812.

YARNALL-WARING COMPANY
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YARWAY steam plant equipment

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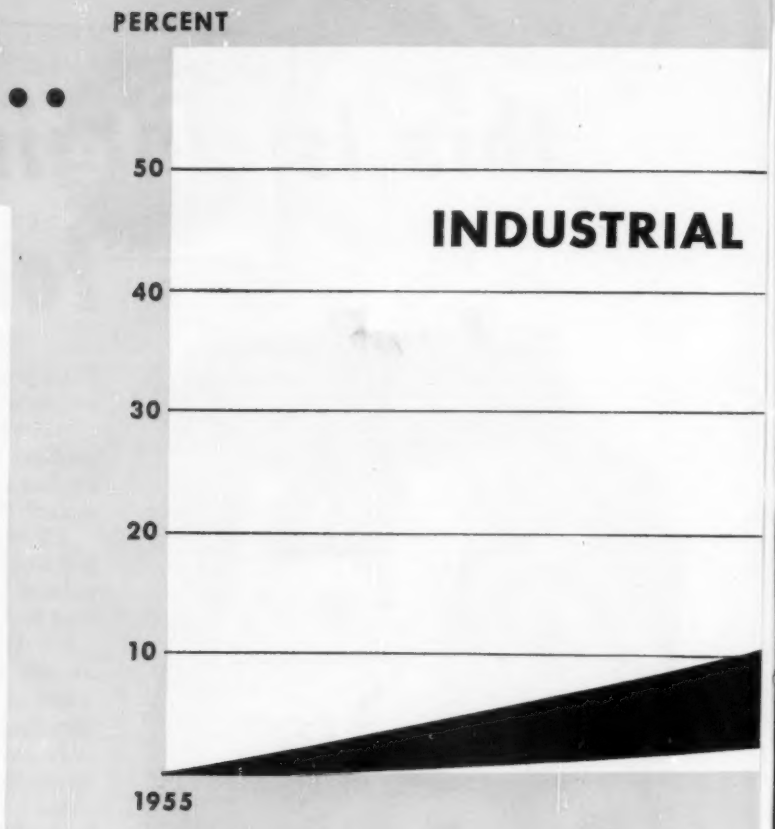

H. F. McCULLOUGH, general manager, Service Shops Department, General Electric Co. explains below why . . .

WITH INCREASED EMPHASIS ON AUTOMATION . . .

"Accent on maintenance" becomes industry's

It's no secret that American industry today is making giant strides into a new era—marked by the increased use of automatic machines, more continuous process methods, and a greater application of electric power per manhour. This era of automation is a result of the sharpening of competition, requiring more production from existing equipment, better methods for making better products, and better machines to do more work at less cost.

• **Taken for granted**—But all this is focussing new attention on a production factor hitherto taken for granted—maintenance. For as more automatic machines are introduced to quicken the production tempo, and to make up for limited available manpower and to reduce product cost, the maintenance function assumes a far greater importance. As one indication of this, the cost of all industrial maintenance in 1952 was over $11 billion, while by 1965 it is estimated to reach $22 billion annually.

• **Production demands**—Present and future production demands require the training of highly skilled and well planned maintenance to prevent idle machinery and profit-eating downtime costs. The ultimate aim of any maintenance program is to reduce unit cost of goods sold; therefore, planned maintenance helps the manufacturer do this by getting the maximum use from his equipment and reminding him to make modifications or renewals on a planned rather than a hit-or-miss basis. With this trend towards automation, today's stepped-up production combined with increased labor, materials and equipment costs dictates a scheduled maintenance program.

• **Maintenance not ready**—On its present scale, maintenance cannot successfully cope with the staggering job ahead. To back up the abilities of maintenance men and their effective use of tools and materials, management too must apply to maintenance the same skill, brains and capital investment that have so strikingly improved production planning and techniques. In fact, with automation, production itself depends largely on the proper planning and execution of equipment maintenance.

• **Involuntary shutdown**—It must be remembered that an emergency downtime during production not only results in

key to all future production planning

lost production and profits, but also forces upon labor an involuntary layoff; therefore, machinery equipment failure is as disastrous for all when it occurs on a production line geared for high production with a large degree of automation. Again it comes down to the question of maintenance. Does management wait for a failure then apply maintenance on a put-out-the-fire basis or does management put into effect good maintenance practices, scheduling maintenance at times most convenient to the production line. Scheduled maintenance minimizes the "dollar" loss. Naturally all emergency shutdowns cannot be eliminated, but Productive Maintenance can and is reducing such situations.

• **Management and maintenance**—One fact that emerges is that management and maintenance must join forces in a carefully thought-out program to meet the challenge of automation. Both are part of the company team, interested in bringing the many benefits of planned equipment maintenance to the over-all job of delivering goods to customers on time, using manpower most efficiently, and keeping product cost low.

FOR AN EFFECTIVE APPROACH TO THIS IMPORTANT PROBLEM

GENERAL ELECTRIC

When management teams up with maintenance, the result is

YOUR G-E MAINTENANCE SPECIALIST will supply complete parts data . . .

. . . guide you in planning routine inspection, routine maintenance and parts inventories . . .

Start now with General Electric's

HERE'S THE 5-STEP PLAN IN BRIEF: (and General Electric can help you with every step)	**1** Gather complete equipment data from your machines and motors	**2** Evaluate routine maintenance to determine how much care is warranted
3 Establish a routine operating control system	**4** Evaluate the critical maintenance that is needed	**5** Establish a critical maintenance program

more effective maintenance that actually adds production capacity

. . . help you determine condition of all critical equipment and help schedule planned overhaul . . .

. . . help analyze critical equipment for best protection of each machine.

5-step *Productive Maintenance* plan

It organizes the application of men, tools and materials to help protect capital investment, increase productivity, reduce product cost

A practical, realistic approach to the growing importance of maintenance in the automation era is General Electric's Productive Maintenance plan. In a simple 5-step sequence, it organizes the elements involved in controlling equipment downtime to improve maintenance of electrical systems. Because it is applicable to any type of industrial operation, it is becoming widely accepted throughout industry by management and maintenance men alike. Learn more about how this plan can help you obtain more output from existing facilities. Use the coupon to have a G-E Maintenance Specialist call and supply you with complete information. General Electric Co., Schenectady 5, N. Y.

General Electric Company
Apparatus Sales Division, Section G 801-17
Schenectady 5, New York

- ☐ Please send me the detailed manual (GEA-6087) on setting up a Productive Maintenance Program in my plant.
- ☐ Please have a Maintenance Specialist from my nearest G-E Service Shop call on me.
- ☐ I would like to schedule a showing of the film "Productive Maintenance."

NAME.....

POSITION.....

COMPANY.....

CITY..... STATE.....

***Productive Maintenance*—as vital as production itself!**

GENERAL ELECTRIC

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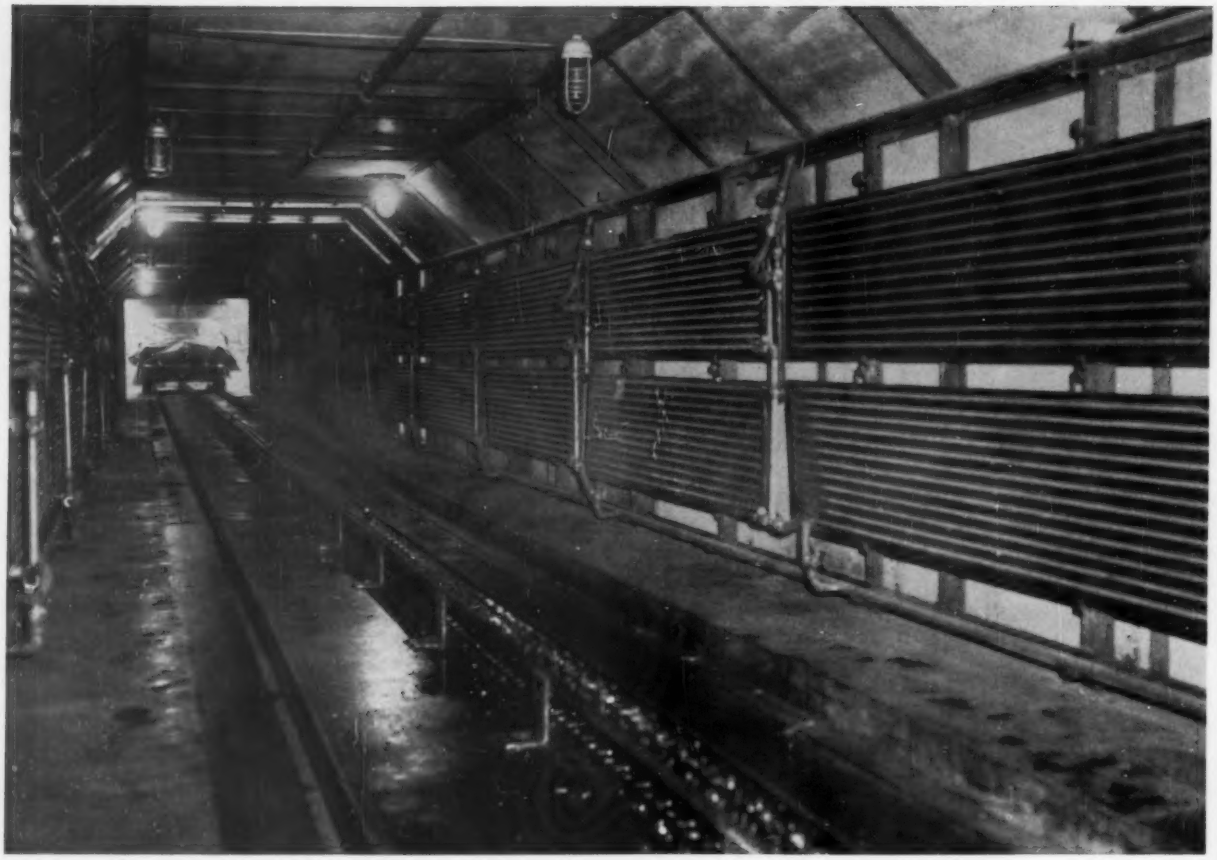
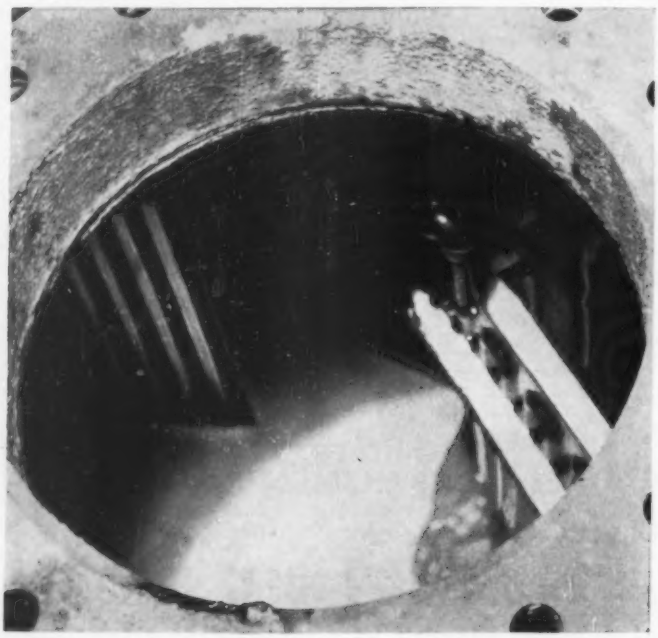


MAINTENANCE SLASHED AT LINCOLN MERCURY New cars that are marred or scratched are "touched up" and run through this 150-foot paint-drying oven at the Lincoln-Mercury plant at Robertson, Mo. Heat comes from 44 Platecoils, each 22" wide and 119" long. An individual unit can be replaced in minutes without disturbing other units.

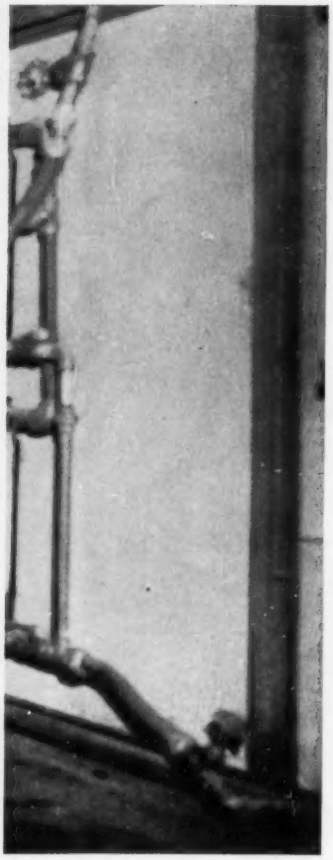


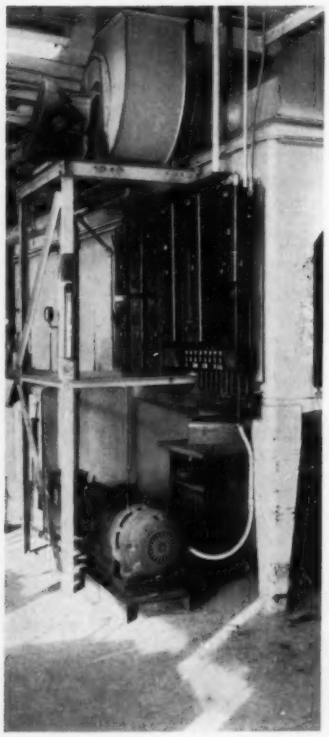
NEW PLATECOILS COST LESS THAN MAINTENANCE

Just removing the motor, agitator and bolted-down tank cover to get at pipe coil in a slurry cooling tank cost Sherwin-Williams Co. more than the price of Platecoils that do the job now. Platecoils can be installed through the manhole in the cover.

$1440 SAVED YEARLY AT BURROUGHS

Monthly cleaning of black iron pipe coils used for heating in a Parker Bonderite system cost Burroughs Corporation $1,440 a year. Electroplated Stainless Steel Platecoils required no cleaning in a year. In addition, heat up time was reduced from 2 hours to only 30 minutes.





Please send me the Platecoil story.

My problem is _____

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TRANTER PLATECOILS®

SAVE A LOT OF TIME AND SOME MONEY

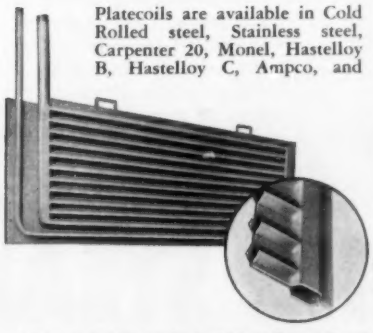
Add up all the manhours you spend in engineering, fabricating, installing and maintaining pipe coils for process heating and cooling. When you use Tranter Platecoil heat transfer units, you eliminate engineering and fabricating time and drastically slash installation and maintenance time to make big savings. And frequently you can add more savings that come from increased tank capacity and a shorter operating cycle that Platecoil's compact size and extra efficiency make possible. Tranter Platecoils come in standard sizes and give dependable standardized performance. Delivered to you from factory-tested stock, they are ready to go to work for you when you get them. Installed on quick-change hangers, these lightweight compact units can be installed or replaced in a few minutes without hoists or other machinery. They will save you a lot of time and some money.

THESE ADVANTAGES CUT COSTS

Platecoils take less room than pipe coils and increase the work load capacity of the tank. They save valuable floor space. Their rigid, continuous, relatively flat surfaces give more heat transfer to handle increased work loads. And this flat surface resists accumulation of deposits and is easier to clean than a jumble of old-fashioned pipe coils.

NOW AVAILABLE IN THESE METALS

Platecoils are available in Cold Rolled steel, Stainless steel, Carpenter 20, Monel, Hastelloy B, Hastelloy C, Ampco, and Nickel. Orders for Cold Rolled steel and Stainless steel get fast delivery from factory-tested stock.



PLATECOIL

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TRANTER MANUFACTURING, inc.

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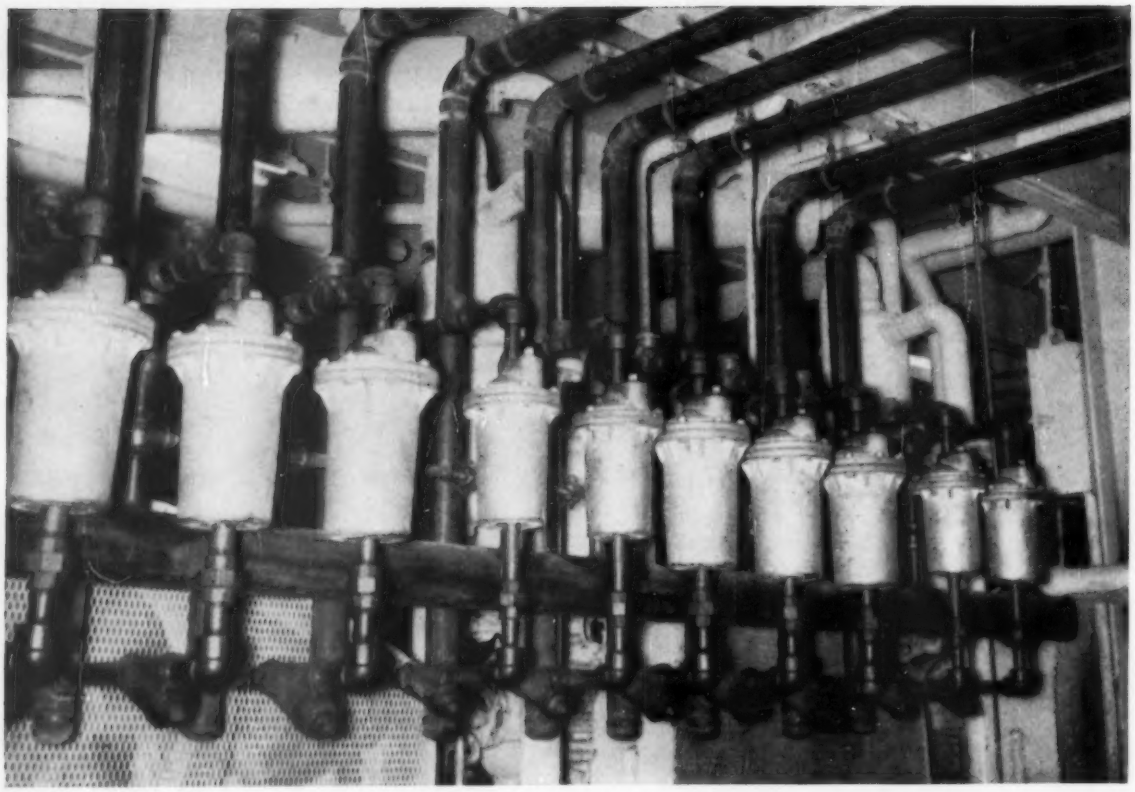

Tip on Choosing Steam Traps: Run Tests with a Pyrometer

Bottom inlet-top outlet traps in six sizes, ½" to 2" connections; 950 to 20,000 lbs/hr capacity.

Side inlet-side outlet traps in five sizes, ½" to 1¼" connections; 680 to 6700 lbs/hr capacity.

Integral strainer traps in three sizes, ½" and ¾". Cost less than trap and separate strainer, save fittings and labor.

A common problem—Traps on Rogers spray driers at Rochester Dairy Company, Rochester, Minn., required frequent servicing—used up about two months of one man's time annually. And, then, within about 30 days after trap servicing, drier temperatures would be 100 degrees below steam temperature. Nobody has to put up with such trap troubles!

Take a tip from this solution!—Henry T. Maass, Building and Utility Supt., took action. He ran extensive pyrometer tests on his driers, using different makes of traps.

100° hotter!—The driers are now equipped with Armstrong inverted bucket steam traps. Temperatures correspond to steam pressure—100 degrees hotter than before. Maintenance?—negligible. Rochester carries $63.31 of Armstrong trap parts in maintenance store against $873.52 in parts for another make of traps that haven't been replaced yet.

Moral—A small investment in Armstrong steam traps can make a world of difference in performance of production equipment and in cost of maintenance. Call your local Armstrong Representative, he has the products and the experience and the ability to be of real assistance.

FREE CATALOG

The 44-page Steam Trap Book is "the handbook of steam-trapping". Selection, installation, maintenance, capacities, data, prices, tables, charts, useful material—yours for the asking without any obligation. Also see data in Sweets or Chemical Engineering Catalog.

Armstrong Machine Works
912 Maple Street, Three Rivers, Michigan

Application Engineered
ARMSTRONG STEAM TRAPS

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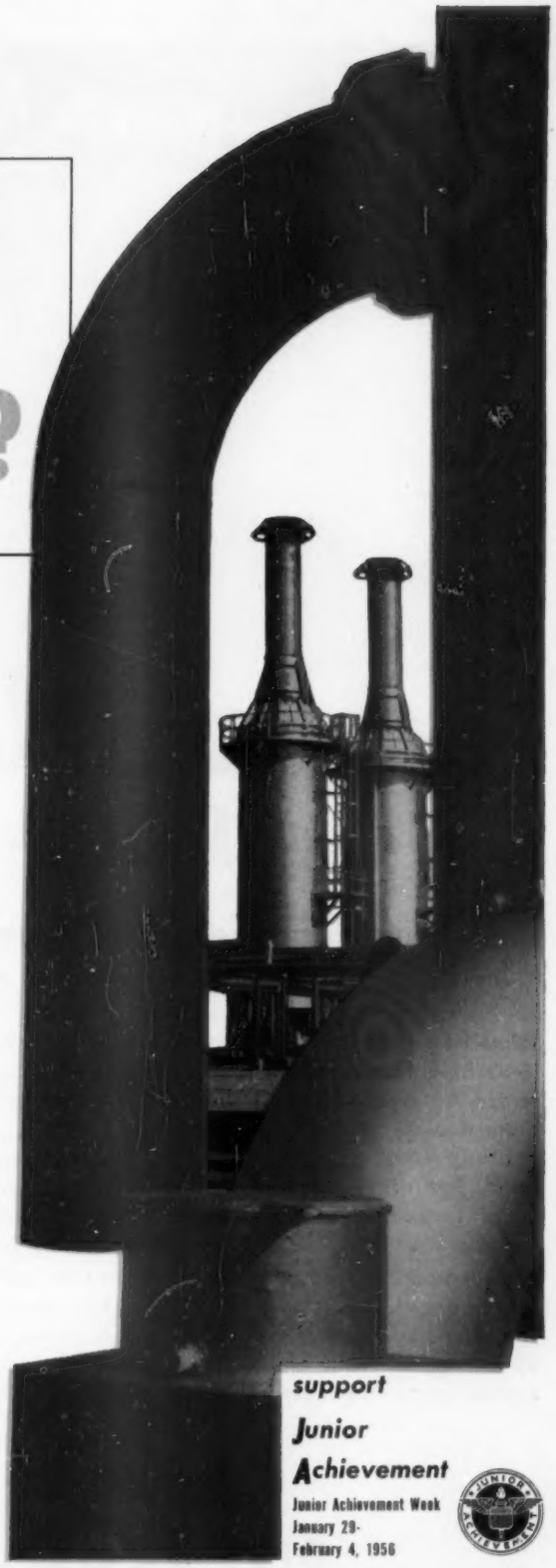
What's new in PETROLEUM?



There's a lot that's new to you in petroleum if you haven't kept pace with recent developments. For improvements come so rapidly in this progressive industry that it's difficult to keep abreast of them.

Improved motor oils, cleaner burning fuels, more effective rust preventives—these are a few of the developments that may find profitable application in your plant or business enterprise.

One man who keeps abreast of developments in petroleum science is the Gulf Sales Engineer. This trained specialist can help you find opportunities for important savings in operating and maintenance costs through the use of the most suitable fuels, lubricants, solvents, waxes, and process oils.

Why not get in touch with a Gulf Sales Engineer today? Consult the telephone directory for the number of your nearest Gulf office. Gulf Oil Corporation · Gulf Refining Company, 1822 Gulf Building, Pittsburgh 30, Pa.

GULF

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January 29-
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THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

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This Aquadam Asbestos Smooth-Surface built-up roof—like its companion product, the slag- or gravel-surfaced Aquadam roof—offers the extra protection of new, high-bond-strength Aquadam.

Aquadam Built-Up Roofs

in a slag-gravel or a smooth-surface specification

(for deck inclines from dead level to ½" per foot)

Johns-Manville Aquadam built-up roofs have been specifically developed to give the best possible protection to a building. Before publicly announcing Aquadam roofs, Johns-Manville has thoroughly tested the specifications in the field over a period of years.

Aquadam built-up roofs—in slag or gravel, or smooth-surface specification—owe their superiority to Aquadam—the bituminous asphalt cementing agent developed exclusively by Johns-Manville for use in the application of the roofing felts.

Accelerated weathering tests have proved Aquadam to be nearly twice as resistant to excessive exposure as other bitumens. In standard ductility tests Aquadam proves its greater resistance to cracking, by exhibiting more than 100% greater ductility than other bitumens. In addition, Aquadam offers improved self-healing properties, stronger bond, greater resistance to water, excellent uniformity—PLUS important installation advantages such as greater kettle stability.

For information about Aquadam Built-Up roofs, see your Approved Johns-Manville Contractor. He's listed in the classified telephone directory. Or write Johns-Manville, Box 158, New York 16, N. Y. In Canada: 565 Lakeshore Road East, Port Credit, Ontario.

See "MEET THE PRESS" on NBC-TV
sponsored on alternate Sundays by Johns-Manville

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

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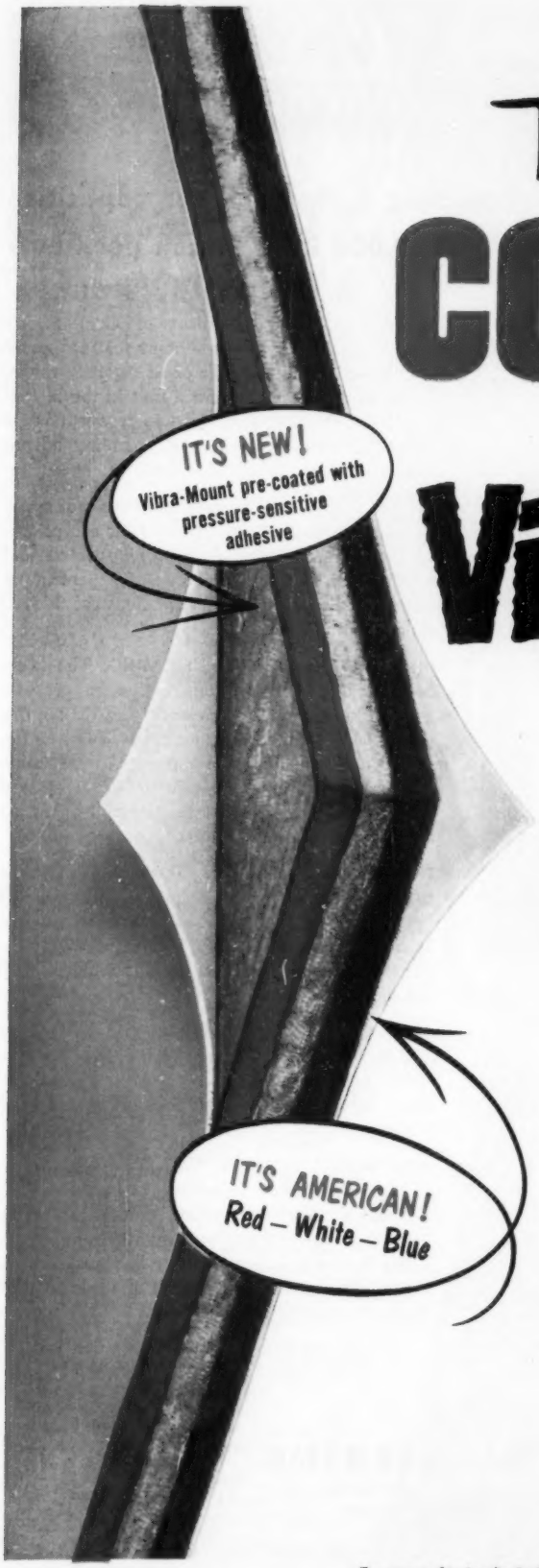


This FELT can CONTROL that Vibration!

When machinery has the shakes, put it on Vibra-Mount* Felt. This resilient cushion greatly reduces the amount of vibration transmitted to the floor, as much as 85%. People are happier, buildings safer. Vibra-Mount Felt is long lived because it takes compression with a minimum of set. In almost every case lag bolts are unnecessary, so machines can be rearranged with a minimum of difficulty. Write for FREE booklet, "How to Reduce Vibration." For technical information, ask for Data Sheet No. 10.

*T. M. Reg.

American Felt Company
TRADE MARK ®

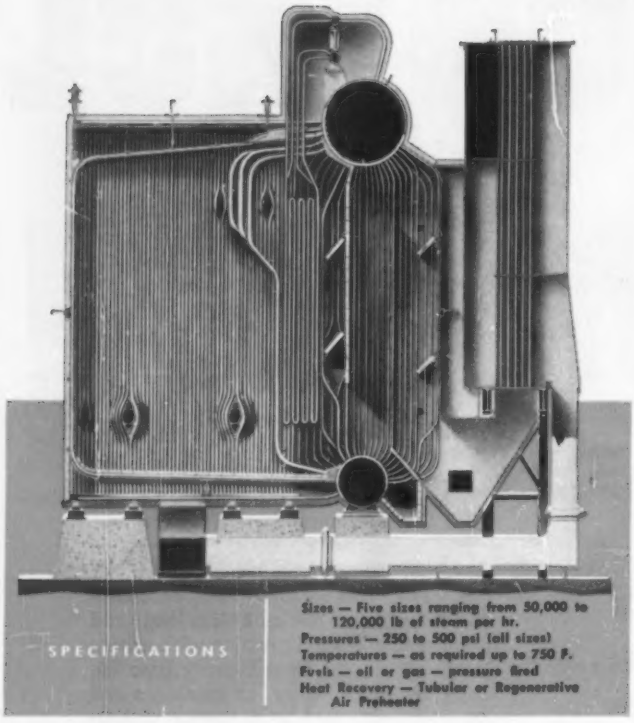
GENERAL OFFICES: 80 GLENVILLE ROAD, GLENVILLE, CONN.
SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Greenville, S. C., Dallas, San Francisco, Los Angeles, Portland, Seattle, Montreal.—PLANTS: Glenville, Conn.; Franklin, Mass.; Newburgh, N. Y.; Detroit, Mich.; Westerly, R. I.—ENGINEERING AND RESEARCH LABORATORIES: Glenville, Conn.

For more facts circle 511 on Reply Card

These performance-proved features make Combustion's

NEW VU-55

today's outstanding boiler buy for capacities from 50,000 to 120,000 lb of steam per hour!



SPECIFICATIONS

Sizes — Five sizes ranging from 50,000 to 120,000 lb of steam per hr.
Pressures — 250 to 500 psi (all sizes)
Temperatures — as required up to 750 F.
Fuels — oil or gas — pressure fired
Heat Recovery — Tubular or Regenerative Air Preheater

The VU-55 — a development of Combustion's basic *V*ertical *U*nit design — offers features never before available in a boiler of its capacity range. If your steam needs call for a unit in the 50,000 to 120,000-lb class, you will find it worth while to consider the economic and operating advantages assured by these VU-55 features:

TANGENTIAL FIRING. More than 20 years of application experience have established the exceptional advantages of tangential firing, illustrated and briefly described below. About 90 percent of Combustion's large utility installations use this advanced method of firing.

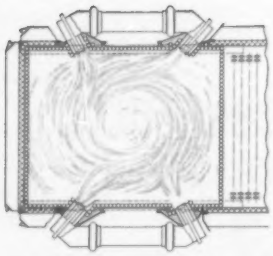
DOUBLE WALL, PRESSURIZED CASING. The latest development in casing construction for pressure firing of boilers in the size class of the VU-55, this casing, as illustrated and described below, is designed to assure lifetime tightness with minimum heat loss. Pressure firing permits the elimination of an induced draft fan with its attendant operating and maintenance costs.

TANGENT FURNACE TUBES. The VU-55's furnace tube arrangement provides complete heat-absorbing, water-cooled protection on all furnace walls. Furnace maintenance is minimized, refractory expense is eliminated, heat absorption rates per sq ft are higher.

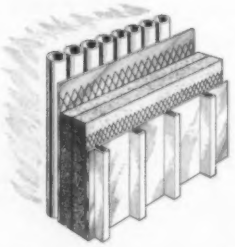
HIGH STEAM QUALITY. Equipped with a large (60-in.) steam drum, the VU-55 has generous water capacity and steam reservoir space. C-E drum internals assure high quality steam at all ratings.

STREAMLINED EXTERIOR. The overall appearance of the VU-55 reflects the efforts of its designers to achieve a completely unobstructed casing, while retaining adequate access wherever required and every facility for convenient operation. There are no outside downcomer tubes, and ducts from air heater to burners are beneath the furnace floor.

Your request for further information on the VU-55 Boiler will receive prompt attention



PLAN VIEW OF FURNACE showing arrangement of burners for tangential firing. Flame streams from the four burners impinge upon one another at high velocity, creating a turbulence unattainable by any other method of firing. The result is rapid and complete combustion. As the gases spiral upward, they sweep all furnace heating surfaces, assuring a high rate of heat absorption.



PERSPECTIVE OF FURNACE WALL. Construction consists of tangent tubes backed up successively by welded steel panels, 4 inches of high quality insulating material and an outer steel casing formed as shown to provide adequately for expansion and assure ample strength. Low heat loss and the tightness required for pressure firing are assured by this welded, double-wall construction.

COMBUSTION ENGINEERING

Combustion Engineering Building, 200 Madison Avenue, New York 16, N. Y.
CANADA: COMBUSTION ENGINEERING-SUPERHEATER LTD.

C-E 8870A

Steam Generating Units; Nuclear Reactors; Paper Mill Equipment; Pulverizers; Flash Drying Systems; Pressure Vessels; Domestic Water Heaters; Soil Pipe

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BENJAMIN

"DIFFUSER" REFLECTOR UNITS

...the Quality is UP, as well as the Light!

...the Light is UP!

- 12% Upward Light for Greater Seeing Comfort*
- 85%-or-better Reflection Factor gives you MORE LIGHT!
- 83%-or-better Light Output Efficiency lets you take maximum advantage of efficient fluorescent light sources.

*for 2-lamp unit. 10% for 3-lamp unit.

...the Quality is UP!

- Top-quality "Life-Time" Porcelain Enamel Reflector!
- Delivers more light with easier maintenance!
- Rust-resisting channel finish.
- Available for 40-Watt Rapid Start or Preheat Lamps and in "Magna-Flo" construction for 96" and 48" Slimline Lamps.

New standards of industrial lighting call for UPWARD LIGHT to reduce brightness contrast, increase seeing comfort and minimize eye fatigue. You get this Upward Light with the Benjamin Diffuser-Reflector, without sacrificing the higher light levels on the *working surface* called for by today's industrial lighting standards.

Bulletin AD5929 brings you complete facts and lighting data on Benjamin's complete line of fluorescent equipment. Benjamin Electric Mfg. Co., Dept. PE, Des Plaines, Illinois, makers of famous Benjamin and Leader Line Lighting Equipment and Sound Signals for Industry, Institutions, Commerce.

Sold Exclusively through Electrical Distributors

NO OUT-OF-SERVICE TIME Due to socket failure with depressible, exclusive, Benjamin, patented metal-clad, rust-resisting "Springlox" Lampholders. Contact is positive. Lamps are locked securely in place.

SUSTAINING MEMBER

B-8821

For more facts circle 513 on Reply Card

HOW TO USE HALLOWELL ADJUSTABLE SHELVING

SELECT THE BASIC SHELVING UNIT

USE IT INDIVIDUALLY

OR IN COMBINATION

CLIP IN DIVIDERS

PUT IN SHELF BOXES

ADD SLOPING SHELF UNITS

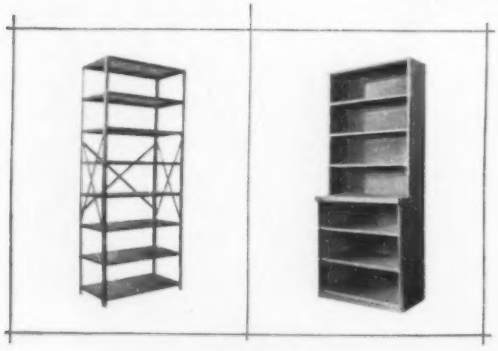
AND

BIN FRONTS

AS NEEDED

ATTACH SWINGING

OR SLIDING DOORS



Baked-on Enamel Finish · Sturdy Steel Construction · Interchangeable Parts Easy to Assemble · Stocked by Leading Shop Equipment Dealers · Send for Bulletin 2057 · Hallowell Shop Equipment Division · Standard Pressed Steel Co., Jenkintown 26, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

BENCHES (CABINET, WORK, UNIT) • STOOLS AND CHAIRS • SHOP DESKS • TOOL STANDS AND CABINETS • DRAWERS, DRAWER TIERS • STEEL CARTS • SHELVING

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EXON: each resin engineered for a specific problem

EXON 481

specifically for

CONSTRUCTION COATINGS

Site application of colorful, abrasion-proof coatings that last is now possible with the development of EXON 481 resin.

Simply sprayed on by a gun with 60 lbs. pressure over a prime coat, the stainproof, scuffproof sheeting dries the instant it is applied. Application is so quick and easy that the most complex shapes are no problem. No loose ends, seams, laps or joints.

EXON 481 has exceptional tensile strength — over 1000 lbs. per square inch with an elongation factor up to 200%. It is soluble in ketones, compatible with plasticizers, stabilizers and all pigment types.

As a result, coatings of the most decorative, attractive colors can be formulated. All completely washable, they ruggedly resist fading or cracking.

Firestone

For complete information or technical service on EXON *481 and on all the resins in the ever-growing* EXON *line, call or write:*

CHEMICAL SALES DIVISION

FIRESTONE PLASTICS COMPANY, DEPT. 615-C, POTTSTOWN, PA.
DIVISION OF FIRESTONE TIRE & RUBBER CO.

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NEW Burkay B-180

...a glass-lined booster water heater!

Only A. O. Smith can give you such a water heater. The new B-180 has an A. O. Smith glass-lined tank — corrosion-free construction *plus Burkay* ruggedness, efficiency and long life. The B-180 meets your sanitizing hot water needs and provides economical operation.

The new Burkay B-180 was designed specifically for the sanitizing rinse needed in the small restaurant. Now you can easily have the sanitizing rinse water for your dishwashing machine to meet Sanitation Code Requirements.

You can now have 180° F. sanitizing water at low cost. With pre-heated water, the Model B-180 will supply the 180° F. rinse water needed for the single tank intermittent operating dishwashing machine or the hand rinse. Furthermore, it fits easily under the counter . . . takes up a minimum of valuable space. The B-180 costs less to operate—is inexpensive to install . . . easy to maintain . . . operates on all gases. Install it today.

See your A. O. Smith distributor or your gas company.
"Plenty of Hot Water Pays All Ways"

Burkay Model B-180—small booster water heater with a *glass-lined* tank for generating sanitizing rinse water for the single tank door type dishwasher.

Input: 50,000 BTU /hr. (45,000 LP & LP air).

Recovery: 42 gal. /hr., 100° F. rise.

Capacity of tank: 8 gal.

Height: 30½", fits under a counter. Diameter: 19".

Controls: Robertshaw-Fulton Unitrol No. 400.

Improved thermal barrier for high efficiency.

A.G.A. approved.

IDEAL FOR: Diners, Fountains, Lunch Counters, Cafes, Grills, Tea Rooms, Taverns, and other medium to small eating places.

TEAR OUT NOW and MAIL FOR FULL DETAILS

A. O. Smith Corporation
Permaglas Division, Kankakee, Illinois, Dept. PE-156

Gentlemen: Please send me immediately full details on the New Burkay B-180.

Name.....Title.....

Company.....

Address.....

City.....Zone....State.....

National Plant Maintenance & Engineering Show
A. O. Smith Burkay Exhibit, Booth No. 1864
Philadelphia, Pa. • January 23 thru 26, 1956

Through research ... *a better way*

A.O.Smith
CORPORATION
Permaglas Division, Kankakee, Illinois

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BULLETINS just released and of immediate plant interest

On pages 181-182 are two postage-free Reader Service Cards provided for your convenience in ordering these bulletins. You may also use the cards to order any literature mentioned in ads.

LIGHTING, COMMUNICATION

101 Recessed Lighting—Divided into sections to aid in selection of lighting units, this 36-pp catalog gives complete illustrations and detailed dimensional data for one- and two-foot architectural troffers in all types of ceiling construction. Includes information on various ceiling lighting patterns, plus selection of shielding designs in plastic, glass, lens (flat and dished), plastic louvers. Also gives specifications and photometric tables. Smithcraft Lighting Div.

102 More Light For Less Money—Eight-pp Bulletin MV-403 describes typical applications of mercury vapor lamps in industrial plants, in outdoor areas and in special situations. Sixteen lamps are described along with their specifications and applications. Also contains a list of most common questions about mercury vapor lamps and their answers. Lighting Div., Sylvania Electric Products Inc.

103 Modern Outdoor Lighting—Sixteen-pp "Outdoor Lighting with Plexiglas," presents information on some advanced methods of lighting outdoor areas evenly, with minimum glare and low operating costs. Describes and pictures the fluorescent luminaire fitted with protective diffusing shields of weather-resistant Plexiglas. Discusses quality of light delivered, and the maintenance, safety and appearance features of such luminaires. Photos show installations in plant areas, parking lots, other places. Rohm & Haas Co.

104 For Emergency Lighting—Catalog 10, 8-pp, offers technical data on equipment designed to provide instant automatic emergency lighting protection whenever the regular source of power fails. Includes automatically charged lighting units, types for hazardous areas, emergency power systems, exit lights, emergency light and hand lamps, lanterns, low voltage extensions. Electric Cord Co.

105 Inter-Plant Telephone—How one company uses an internal, company-owned dial telephone system to speed up communications and control operations is described in illustrated Circular 1769. Discusses problems involved in assuring constant contact between departments and shows how automatic telephone communication separate from the city system helps solve these problems. Automatic Electric Sales Corp.

ELECTRICAL

106 Low Voltage Switchgear — Twelve-pp Bulletin 6004B presents low voltage switchgear of the metal-enclosed, drawout type for indoor and outdoor installation using Types K and LG air circuit breakers. Design and construction details are explained and illustrated and emphasis is placed on safety advantages afforded by test position with door closed. General specifications and standard frame arrangements given. I-T-E Circuit Breaker Co.

107 Control Transformers — Catalog GED-2767, 32 pp, on control transformers, includes information on autotransformers, machine tool transformers and special application models. Contains ratings, dimensions, product features and model numbers. Also included are list prices, weights, and wiring diagrams. A special section shows panel and machine tool voltage regulation curves for use in selecting the proper transformer. General Electric Co.

108 Test Equipment—Catalog R36A illustrates and describes complete line of test equipment, including instruments for servicing communications equipment, as well as all industrial electronic and electrical equipment. Also describes simplified methods of visual alignment. Weston Electrical Instrument Corp.

109 Fuse Links—Twelve-pp Booklet GEA-6264 on EEI-NEMA standard fuse links covers the use of both fast and slow-melting cable-type links in distribution cutouts with ratings up to 15,000-v. Gives time-current curves and co-ordination tables to help utilities make the changeover to the standard links. General Electric Co.

110 For High Voltage Cable—Test results and service records on an improved butyl rubber compound for high-voltage cables are announced in 12-pp Bulletin EB-27. Covers resistance to ozone, operating temperature, high-voltage, dielectric strength, aging, insulation resistance, mechanical moisture absorption, electrical moisture absorption, capacity and power factor. Diagrams, charts and tables amplify text. Anaconda Wire & Cable Co.

MATERIALS HANDLING

112 Overhead Handling System—Engineering and application data on overhead handling equipment is presented in 12-pp Bulletin 2008-L. Describes stresses developed in various type tracks used for overhead handling systems. Problem of track peening and its solution is also covered. Data is given on principal components of systems. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

113 Economical Cranes—Eight-pp Unit 86, on company's E cranes, tells why this type of overhead traveling crane is valuable in industries where cranes are used intermittently or where high-speed lifting and travel are not essential. Contains photos and explanations of major components such as hoist mechanisms, drive assemblies, trolleys and controls. Also gives dimensions, capacities. Whiting Corp.

114 Magnetic Conveyors—Eight-pp Bulletin MC-250 describes Space Saver magnetic conveyors for automatic handling of ferrous parts and pieces. Contains details on design features, operating advantages and application possibilities for both standard and custom models. Includes pictures of the conveyors, applications. The Homer Mfg. Co. Inc.

115 Conveyor Belt Carriers—Sixteen-pp Bulletin 355 covers company's line of standard units, including their newest addition—a long center roll carrier with either 35 or 45 deg slope and rolls for greater carrying capacity on light materials, such as grain and wood chips. Describes a number of special carrier units, as well as belt conveyor trippers and accessories. Stephens-Adamson Mfg. Co.

116 Crane Controls—Bulletin CE-400 points up advantages of modernizing cranes through "job-engineered" electrical controls. To many firms using cranes for materials handling, it shows how new designs and improvements save time and money, make operator's job easier. Ederer Engineering Co.

117 Bucket Elevator Chains — Dura-Tred Chains and company's drive wheels for bucket elevators and conveyors are described in 8-pp Catalog DC-855. Includes a detailed discussion and illustrations of this design chain. Types of available chains are listed along with various metals from which these chains are made. Tables list relative corrosion resistance and physical properties of chain metals. Beaumont Birch Co.

118 Wire Rope Slings—Featured in this bulletin are Dura-grip wire rope slings and construction advantages offered by them. Illustrates various assemblies for which the slings can be used, and lists dimensions and rated capacities. Wickwire Spencer Steel Div., The Colorado Fuel and Iron Corp.

119 Tips on Truck Selection—Factors to consider when choosing an industrial truck are detailed in this illustrated folder. Discusses truck's capacity, lift, total weight and size, battery capacity, mechanical features and location of operator and truck controls. Table lists 22 points to be used for evaluating type of truck suited to a given operation. The Elwell-Parker Electric Co.

120 Freight Car Movement—Operation and design advantages of company's heavy-duty Trackmobile are pictorially presented in this large "fold-out" pamphlet. Photos illustrate typical applications and a large photo points out important design features. Specifications are included. Whiting Corp.

121 For Small Parts — Eight-pp Catalog DN-1000, covering products in NesTier line of small parts handling equipment, shows how an integrated, plant-wide parts handling system can be custom tailored to individual requirements using standard stocked units. Illustrated with installation photos, catalog describes and gives specifications for NesTier nesting-stacking boxes and baskets, Rollover hoppers, hopper rack assemblies and shelf racks. The Chas. Wm. Doepke Mfg. Co., Inc.

122 Wheels and Casters—Loose-leaf Catalog 155, 28-pp, on industrial and truck casters, covers ten series of swivel casters, eight of rigid casters, and seven of wheels, ranging in size from 2- to 18-in. diam. Includes full descriptions of each item, along with photos, tables of dimensions and other specification data. Phoenix Caster Co., Div. of Rieger Mfg. Co.

CONSTRUCTION

123 Standardized Construction—This 28-pp illustrated catalog on company's system of standardization in building construction presents a description of "F" buildings, a versatile series of flat-roof structures. Also features rigid-frame "A" series, offering clear spans of 100 ft and over; "B" series, center-column buildings where large clear spans are not required; "C" series, clear spans with crane runways, and other facilities. Standard door and window combinations are also covered. Luria Engineering Co.

124 Movable Partitions—Described and illustrated in 28-pp Catalog 900 are partitions utilizing the Attwood system of space dividing for use in manufacturing, warehouse and office areas. Explains how these partitions are easily erected and moved, offer a choice of many framing patterns, other advantages. Discusses paneling materials which may be used. Typical partition sections are illustrated and framing details provided. Dimensional data on framing members, clevises, nuts and screws included. Unistrut Products Co.

125 Brick Floors—Advantages of brick as a floor material are pointed out in this illustrated bulletin, 3h/Dr. Stresses such qualities as handsome appearance, excellent sanitary properties, resistance to acids and alkalies, durability, easy cleaning. Application photos included. Drehmann Paving and Flooring Co.

126 Metal Stair Treads—Extruded and cast metal safety treads recommended for stairway repair are described in this illustrated folder. Tells how to repair stair treads that have become worn. Wooster Products, Inc.

INSTRUMENTS, CONTROLS

127 Versatile Electronics—How flexibility of electronic temperature controls makes them useful in a wide range of heating and air conditioning installations is explained in this 16-pp booklet, Bulletin SA-2681. Purpose of publication is to fill the gap between the theory of electronic bridge circuits and specific control layouts and circuit diagrams. Four basic features that give electronic control its flexibility and application to a wide variety of installations are described. Minneapolis-Honeywell Regulator Co.

128 pH Equipment—Bulletin Q1305, 16-pp, includes a price list and specification data on pH recorders and controllers for use with company's electrodes and amplifiers. Specifications are written to enable selection of pH indicating, recording, or automatically controlling equipment best suited to plant needs. Featured is a portable pH recorder designed for stream pollution studies, or use where permanent installation is not justified. The Bristol Co.

BULLETINS

(Begins on page 21)

129 Remote Metering, Control — Bulletin 230-H4A, 8 pp, describes remote metering of flow, level, pressure, temperature, gate position and weight and control of pumps, chemical feeders, valves and levels by means of Chronoflo telemeters. Contains product photos and installation drawings in addition to a discussion of the system's operation. Builders-Providence, Inc.

130 Temperature Control — Catalog G-20 covers differential expansion temperature controls. Included are pictures of current types, a description of their operation, general specifications, and an instrument selection chart. Instruments are suitable for controlling temperatures or for high temperature safety alarms and cut-outs. Burling Instrument Co.

131 Pneumatic Regulators—Eight-pp Bulletin H-2 lists precision-made pneumatic regulator equipment including: filter-regulator combinations, filters and regulators, relays, purge assemblies and control panels. Illustrated with cross section and dimensional drawings, bulletin also gives applications. Conoflow Corp.

132 Potentiometers—Many phases of precision potentiometer design and application are discussed in 16-pp Catalog BED-A42, a symposium of technical articles. Complete information, graphs and charts covering physical and electrical design characteristics are included. The George W. Borg Corp.

133 Tachometers—All Kinds — Bulletin 1048 describes 9 different types of tachometers, some portable, some for permanent mounting on machines, centrifugal, chronometric and vibrating reed types. Shows three new types recently announced—inches per minute indicator, surface speed indicator, and alarm contact tachometer. The Herman H. Sticht Co., Inc.

134 Venturi Tubes, Nozzles—Advantages of using Type TG venturi tubes and nozzles in liquid flow measurement in process industries, power plants, testing laboratories, and mainline metering are discussed in Bulletin 100. Construction and installation details, range of sizes given. Simplex Valve & Meter Co.

135 Purge Meter — Eight-pp Bulletin 120 describes company's line of Brooks-Mite and Sho-Rate purge meters for convenient, dependable small flow indication. Application data, design and construction details and capacity charts given. Brooks Rotameter Co.

136 Standard Conversion Tables—Bulletin F-7255, 16-pp, gives thermocouple temperature-millivolt equivalents. Temperatures are expressed on the International Temperature Scale of 1948. The electromotive force is expressed in absolute units. Plant Engineers will find this a convenient pocket-size reference booklet. Wheelco Instruments Div., Barber-Colman Co.

137 Thermostatic Shower Control — Safety advantages of the Hydroguard thermostatic controls for showers are outlined in illustrated Bulletin 366. Design and construction details are shown, capacity, and applications in industrial plants and institutions cited. The Powers Regulator Co.

138 Oxygen Analyzer—Bulletin 108A describes company's F3 Analyzer, showing how it makes its measurement directly upon oxygen content of gas. Operating principle is illustrated, typical applications are highlighted, and technical data (operating ranges, response rates, sampling equipment) are also given. Arnold O. Beckman, Inc.

139 Conductivity Equipment — Sixteen-pp Catalog 20 lists equipment for measuring and controlling solution conductivity. Presents a wide range of standard instruments and conductivity cells, including recent developments in bridges, cells. Industrial Instruments Inc.

140 Bagging Scale—Bulletin 3749A, 6-pp, describes a versatile bulk weighing scale for process weighing, electrically controlled and pneumatically operated. Discusses scale's heavy duty construction, capacity, accuracy, and process weighing features. Photos illustrate key features, as well as four different installations. Diagrams show dimensions, feeding arrangements. Richardson Scale Co.

PUMPS, COMPRESSORS

142 Pumps, Other Equipment—General information on company's vacuum and liquid pumps, air brake equipment, and hydraulic motors, controls and pumps is presented in 16-pp Bulletin 1102. Illustrated with installation photos from a wide range of industries, booklet is intended to serve as a guide to equipment produced by company's five divisions. The New York Air Brake Co.

143 Air Compressors—Catalog 36, 44-pp, gives a comprehensive presentation of the ¼- through 20-hp line of company's air compressors. Designed as a text and guide, bulletin includes a detailed engineering section, featuring selection information, and tables of computations that will insure correct installation for each job. Also contains descriptions, specifications, dimensions, engineering drawings and photos, as well as information on continuous operating outfits, accessories and controls. Brunner Mfg. Co.

144 Horizontal Compressors — Bulletin L-640-B1C, 24 pp, presents single-stage horizontal compressors from 50 to 2000 cfm and from 10 to 150 psi. Gives information on basic specifications, standard equipment, capacity control, cylinder construction, other factors. A diagram of a complete installation is included along with cutaway views of major components and accessories. Several installation photos and data chart are provided. Worthington Corp.

PIPING, VALVES, FITTINGS

145 Plastic Pipe, Fittings—Reference information for selection of company's unplastic-ized, rigid pvc pipe, where high chemical resistance and/or high impact resistance is desired is contained in the first of two new bulletins. Alpha 101 and Alpha 102 are described, together with charts showing mechanical, thermal, electrical, other properties. Installation data, applications chart listing industries where pipe is recommended, are included. Resistance to wide range of chemicals is shown. Companion bulletin describes threaded and socket solvent cement fittings. Alpha Plastics Inc.

146 General Purpose Valves — Supplement No. 1 to Catalog F-9, 32-pp, offers complete information on company's series of general purpose drop forged steel valves, gate, globe and angle types, sizes ¼ through 2 in. Includes descriptions of each type along with drawings showing component parts. Dimensions and other specifications are tabulated, and a pressure-temperature ratings table is included. Henry Vogt Machine Co.

147 Segregating Valves — Data Sheet Ua covers a line of slide gate type of segregating valves for pneumatic materials handling systems. Describes application, design, and operation of these valves, and gives installation instructions together with dimension drawings and tables. Illustrates various models for automatic or remote operation (with air cylinders), as well as for local manual operation. The Allen-Sherman-Hoff Co.

Reader Service Cards for ordering bulletins are on pages 181-182. Be sure to include your name, job title, and company.

148 Float Traps — Semi-steel float traps equipped with Duo-Step leverage for maximum power and valve travel, providing larger orifices for increased capacity and ability to handle unusual dirt conditions are described in this illustrated bulletin. Applications in maintaining constant levels, continuous drainage installations or for dual gravity service are discussed, specifications outlined. Clark Mfg. Co.

149 Hose Assemblies—Catalog 100, 32 pp, presents a wide range of factory assembled high, medium and low pressure hose assemblies for hydraulic, suction return and general applications. Such features as company's Max-Flo couplings are described. Also included are flow charts, nomographic chart, thread information, methods for computing length of hose assemblies. Anchor Coupling Co., Inc.

150 Swaged Hose — Eight-pp Catalog S-1 shows company's line of swaged hose, hose ends and adapters readily available from distributors. Also featured is a simple, detailed swaged hose assembly numbering system, by which hose assemblies of any size, type, length, pressure and quantity can be ordered quickly. The Weatherhead Co.

151 Water Hose — This data sheet describes special hose constructions for construction projects, high pressure uses; hydraulic bank grading, stripping and sluicing; and for general service in paper and pulp mills. Sizes, pressures, coupling information and construction features for each type are listed. Industrial Products Div., The B. F. Goodrich Co.

152 Hose Couplings — This revised 20-pp catalog contains large cut-away views showing design and construction features. Also described are single-check valve and double-check valve modifications of the coupling which seal off one or both ends of a fluid line the instant coupling is disconnected. To facilitate ordering, tables and diagrams are included which indicate available coupling sizes and types of hose connection, and provide tips on selection. Accessories are described. Titeflex, Inc.

AIR CONDITIONING

153 Air Conditioning Blowers — In 18-pp Form 405B, on Rex blowers, are shown 17 standard belt-driven air conditioning blowers, each available for top or bottom horizontal discharge. Uni-Pak universal models shown may be used to obtain any one of four discharge angles. Also included are five sizes of direct drive blowers. In addition to dimensions and performance data, booklet provides selection charts covering heating and cooling applications. Air Controls, Inc.

154 Air Recovery Panels — Bulletin 106-D covers Dorex Type G air recovery panels for removal of odors and vaporous impurities from recirculated air in comfort conditioning installations. Performance and selection charts included. Connor Engineering Corp.

HUMIDITY CONTROL

155 Sprayed Coil Dehumidifiers — Bulletin 7827, 20-pp, describes company's central station type sprayed coil dehumidifiers and features a section of application data. Water dilution, high humidification, evaporative cooling and selection for size are among the subjects discussed. Also included are such specific data as symbols, formulas and 12 special tables and curves required for accurate selection. Design and construction features, and installation drawings included. American Blower Corp.

156 Controlled Humidity—Performance data on company's controlled relative humidity chamber are presented in illustrated Bulletin 5525. Includes construction details, installation data and specifications. Soiltest Inc.

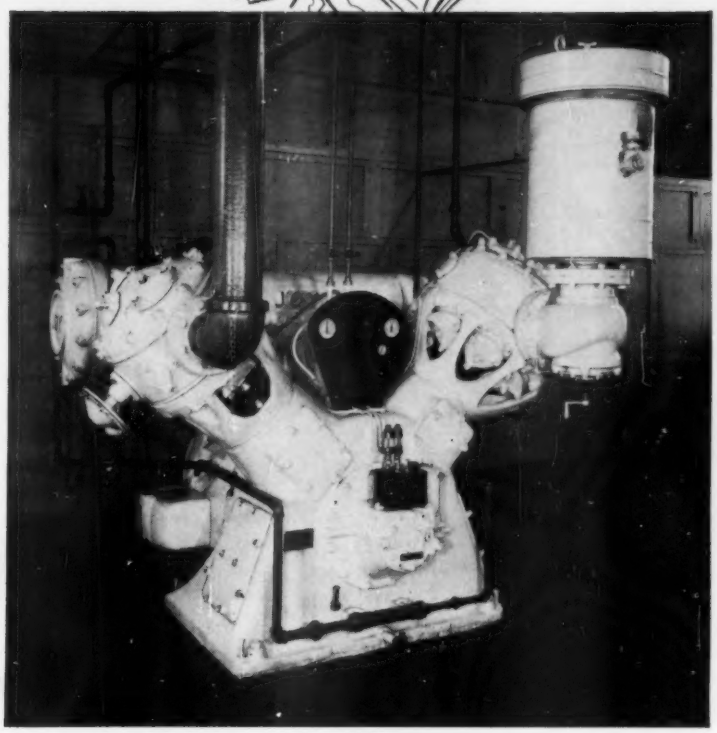
METALS

158 Aluminum Bronzes—Booklet 15.100-1, 32-pp, offers complete engineering data on each grade of company's aluminum bronze, including a specification index chart identifying grades with various government and technical societies' specifications. Also included are drawings and tables of machining recommendations, information on engineering and metallurgical consultation services and a pictorial description of facilities. W W Alloys, Inc.

159 Nickel-Tin Bronzes — "Engineering Properties and Applications of Ni-Vee Bronzes," 28 pp, provides tables, graphs and photos on five basic Ni-Vee bronzes offering superior service for industrial applications in which many brasses and bronzes are now used. The Ni-Vee alloys contain 5 per cent nickel, 5 per cent tin, and varying lead contents. Booklet recommends Ni-Vee types for construction, bearing and pressure castings. The International Nickel Co., Inc.

160 Improved Steel Bar—This 20-pp brochure on company's Fatigue-Proof steel bar, contains 29 pictures and tables. Discusses product's high strength without heat treating, ease of machining, increased wear resistance, other advantages. Tables show chemical and physical properties of this steel bar and a chart compares its strength, machinabili y, other properties with those of carbon and alloy heat treated bars and parts. LaSalle Steel Co.

(More Bulletins on page 183)



The Boss asked:

"WHAT'S SPOILING OUR SKILLED MECHANICS?"

. . . so I told him about our JOY WN-112 compressor

"To begin with, this two-stage, double-acting, water-cooled air compressor is small, light and efficient. V-vertical construction gives the machine excellent balance. The heavy-duty Joy WN-112 supplies dependable industrial air power—up to 125 psi with piston displacement from 368 to 974 CFM.

"And this compressor is *easy* to maintain. It has no large, heavy parts that need adjusting. Cylinder liners and cross-head guides are not an integral part of the frame. They can easily be replaced in a short time. Yes, that WN-112 is a breeze to maintain . . . and *that's* what is spoiling our skilled mechanics."

The WN-112 has two separate, protected, force-feed lubricating systems; one servicing the running gear, the other for the cylinders. Even the cross-head face is force-feed lubricated.

Joy "Dual-Cushion" valves have greatly prolonged life because of the variable reaction cushion which eliminates all pounding valve action. Truncated pistons, of strongly reinforced alloy, permit locating of valves on an angle. This insures smooth air flow and efficient head cooling.

All flange-mounted motors for Joy compressors are built to Joy specification. Floor space and foundation requirements, already minimized by the compressor's package design, are 50% less with the flange-mounted motor. The WN-112 is adaptable to other drives if desired.

For complete details, write ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Write for Bulletin 37-15

Consult a Joy Engineer

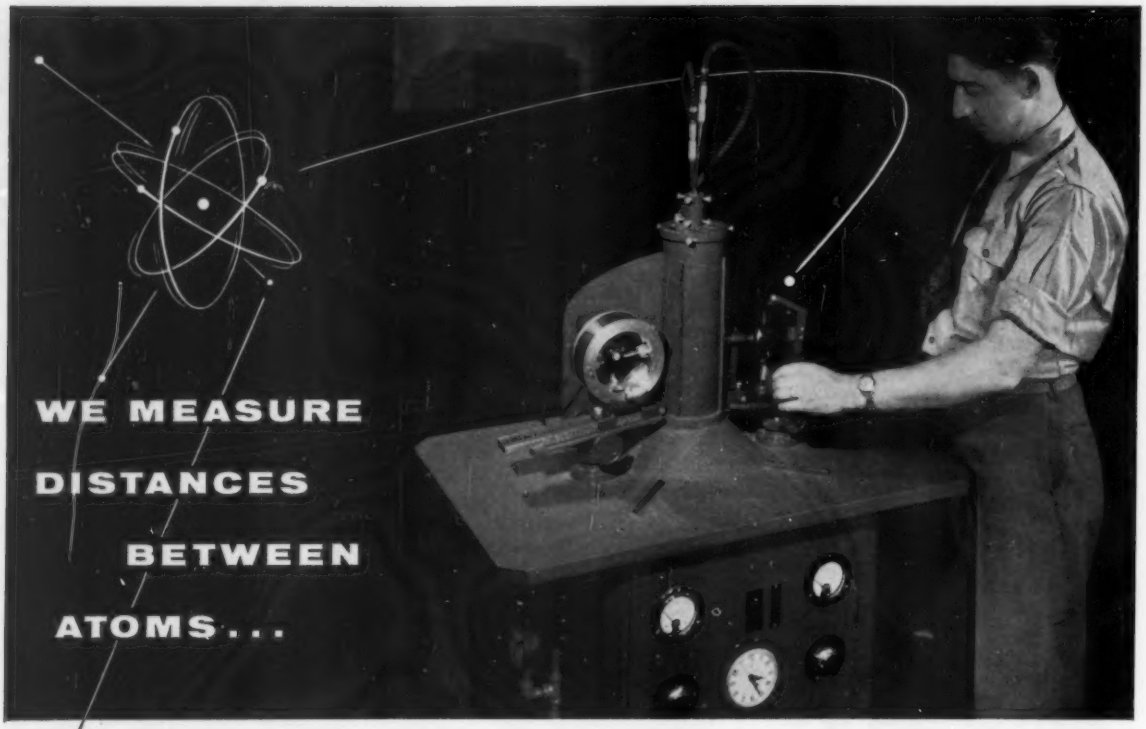
For Air and Gas Compressors, Oxygen and Nitrogen Generators, Vacuum Pumps and Boosters, Conveyors, Fans, Electrical Connectors, Hydraulic Fittings and Hose Assemblies.

WSW 15909-37

JOY

SPECIALISTS IN THE COMPRESSION AND MOVEMENT OF AIR AND GASES SINCE 1885

For more facts circle 517 on Reply Card

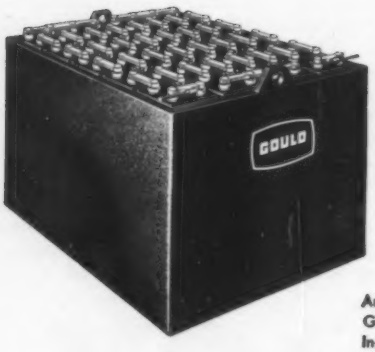


TO GIVE YOU *Advance Design* BATTERIES!

The X-Ray Diffraction Unit shown above is one of the few instruments of its kind being used in basic battery research. It identifies complex metallic compounds which cannot be identified practically by chemical means. It does this by actually indicating on film the distances between atoms, enabling Gould engineers to study atomic structure.

This instrument . . . this research . . . is revealing hitherto unknown facts about the relationship between molecular activity and battery performance . . . pointing the way toward more powerful, longer lasting active materials. That's why you get *better* batteries when you buy Gould!

For the full story on Gould Research, send for Booklet 749.



America's Finest!
GOULD
Industrial
Truck Batteries

©1955 Gould-National Batteries, Inc.

GOULD
Batteries

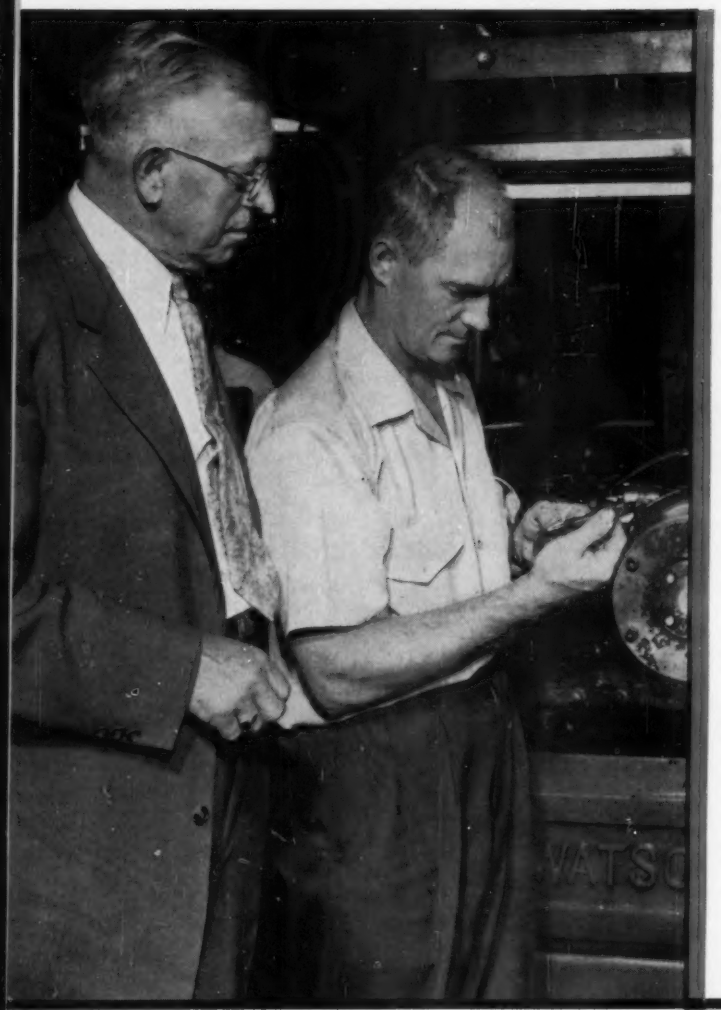
GOULD-NATIONAL BATTERIES, INC.
TRENTON 7, N. J.

"BETTER BATTERIES THROUGH RESEARCH"

Always Use Gould-National Automobile and Truck Batteries

For more facts circle 518 on Reply Card

STANOIL *Industrial Oil delivers on tough assignment at Indianapolis Screw Products Corp.*

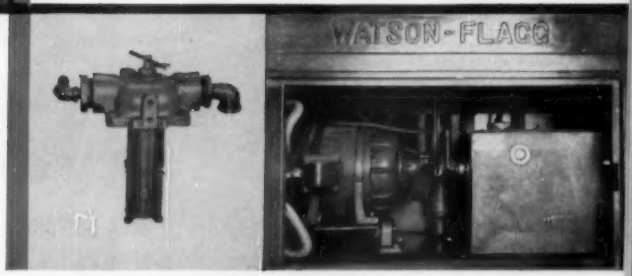


Rolling threads on aluminum bronze with pitch diameter tolerances as close as .0014" is a tough job but Indianapolis Screw Products Corporation is used to taking on such jobs and delivering. They give tough jobs to the hydraulic oil they use, too, and they expect it to deliver. They've given such a job to STANOIL and they're getting the results they expect—and more.

STANOIL Industrial Oil is used in the hydraulic system of a Watson-Flagg precision thread roller in the Indianapolis Screw Products Corporation plant. The system uses a Vickers pump and Cuno filter. The filter has not been cleaned in over a year *because it hasn't needed cleaning.* Here, as in other applications, STANOIL delivers top performance with minimum maintenance and maximum system cleanliness of the hydraulic system.

STANOIL likes tough assignments like this one; likes them because it can deliver with plenty to spare. Perhaps you would like to know about the use of STANOIL in a hydraulic application in your plant. In the Midwest and Rocky Mountain states, a lubrication specialist at your nearby Standard Oil office will be happy to discuss it with you. Call him. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Mr. R. W. Williams, Plant Superintendent checks pitch diameter of thread with Glenn Riggs, Standard lubrication specialist. Glenn Riggs is an old hand at helping industrial firms work out lubrication prob-ems. Glenn has been doing this sort of thing for 28 of the 30 years he's been with Standard. This background and experience, customers have found, pay off for them.



Cuno filter (left) remains clean after more than year filtering STANOIL. Vickers pump on Watson-Flagg Thread Roll machine (right). Good housekeeping and STANOIL team to give top performance in this hydraulic system.

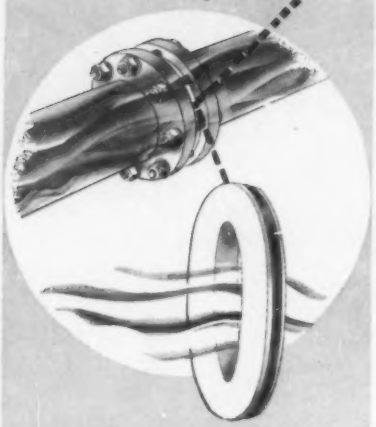
STANDARD

STANDARD OIL COMPANY

(Indiana)

For more facts circle 519 on Reply Card

Unimpeded Flow



CHEMPRO's Style 50 Machined Teflon* Jacketed Gaskets allow unimpeded flow of either liquids or gases. The machined Teflon jacket I.D. fits flush with the flange I.D. Ideal for equipment, valve and piping systems where corrosion resistance and non-contamination of liquid or gas are also required.

By varying the combination of filler materials, the Chempro Style 50 gasket can be made with compression characteristics to meet your specific operating conditions. Fill materials include neoprene, rubber, compressed asbestos, and woven asbestos cloth.

Ordering Information Required

1. Inside and outside diameters.
2. Flange or nozzle material.
3. Operating pressure and temperature of liquid or gas.
4. Equipment make, model and size.

Complete information on Style 50 gaskets is given in Bulletin CP553, Section B.

THE ORIGINAL FABRICATORS OF TEFLON PACKINGS AND GASKETS

*duPont Trademark

CHEMICAL & POWER PRODUCTS, Inc.

7 Broadway, New York 4, N. Y.

For more facts circle 520 on Reply Card

BACKTALK about our past issues

Edited by Marjorie E. Weissman

Cost of Protective Coating?

PLANT ENGINEERING:

"Will you please give us information on Corrocote as described in the October, 1955 issue of PLANT ENGINEERING. We would like to know the cost, size of containers and source of supply.

"We are investigating it for possible use on the cooling tower fan housing paint." *J. L. Hoelscher, The Ohio Oil Co., Refining Division, Robinson, Illinois.*

▶ We have forwarded your name, along with the many others we have received, to Karl Bennung, Jr., President, Chemical Coatings and Engineering Co, Edgemont, Pennsylvania. He is answering all specific questions regarding this product and its application.—*Editors.*

Maintenance Articles Reprinted

PLANT ENGINEERING:

"I understand that you have available for distribution a collection of articles on preventive maintenance. Since we are in the process of establishing such a program here at SKF, I would appreciate receiving a copy of this collection." E. L. Keen, Maintenance Engineer, SKF Industries, Inc., Philadelphia, Pa.

▶ Because of the many requests for these articles we have completely exhausted our supply of tear sheets and have now reprinted the collection.

The eleven articles in the 36-page booklet deal with maintenance forms and systems, work programming, cost control achieved through preventive maintenance, maintenance standards, and training programs.

If any reader is interested in receiving a reprint, they are available at $1.00 each. —*Editors*

Drop Curtains for Dry Kilns

▶ In our October, 1955 issue we published the article "Plastics Problems Pester Plant Engineers." This covered the results of a survey we conducted among our readers. Several of the respondents indicated particular problems they were having that they thought might be solved by the use of a plastic material.

One respondent mentioned that he had been using canvas drop curtains in the dry kilns. The curtains were subjected to a temperature of 180 F in a humid atmosphere laden with tannic acid. These canvas curtains would deteriorate in from 6 to 10 months. He experimented with a sample of plastic material that did not show signs of deterioration after 11 months. However, he has not been able to locate the salesman who left the sample or the company he represented.

This respondent and other plant engineers may find the solution in the letter quoted below.—*Editors.*

PLANT ENGINEERING:

"I found the article 'Plastics Problems Pester Plant Engineers' very interesting. We were especially concerned with the comment about the drop curtains in use in the dry kilns.

"We would like to call this reader's attention to the drop curtains made of our Hycar coated fabrics. They give unusual service and could very well be the answer to his problem." *S. S. Hall, The Surety Rubber Co., Carrollton, Ohio.*

Foam Insulation for Canada

PLANT ENGINEERING:

"Referring to an article in your February, 1955 issue, 'Sprayed Foam Insulation,' I would like to have more information on Poly-Cell.

"We have installed in our Sherbrooke plant a new ventilating system and would like to cover all galvanized iron ducts. I am particularly interested to find out if the manufacturer has a Canadian representative." *J. F. Coyle, Superintendent, Carnation Company Ltd., Sherbrooke, Quebec.*

▶ We have notified Mr. C. N. Cox, Insul-Mastic Corp. of America, 7750 West 61st Place, Summit, Illinois, of your interest in Poly-Cell. We have asked him to forward your name to the firm's Canadian representative, Insul-Mastic, Eastern Ltd., 1355 Dufferin St., Toronto, Ontario.—*Editors.*

Fiber Glass Problem Solved

▶ In our December issue, we published a letter from Glenn A. Gunst, plant engineer of the Fairchild Guided Missiles Division of Fairchild Engine and Airplane Corporation, asking for information regarding the maintenance and care of drills, grinders and sanders used in the fiber glass industry, and any specially designed tools that were in use.

We suggested that Mr. Gunst write to Dirck Olton, manager of the Product Engineering department of Behr-Manning Division of the Norton Manufacturing Company, for assistance with this problem. Mr. Olton obliged, and part of his reply to Mr. Gunst is quoted below. —*Editors*

"One problem on our hands was that of operator complaints caused by fiber

the BIG name in water conditioning is

CONSULTANTS ON INDUSTRIAL WATER PROBLEMS

W. H. & L. D. BETZ, Philadelphia, Pa.

NEW! 'Sexauer' Monel Self-Locking bibb screw —10 sizes do the work of 37!

NEW! 'Sexauer' Easy-Tite faucet washer with Fiberglas reinforcing

This nylon plug locks the screw *automatically!*

NEW! Amazing, patented screw and washer combination cuts faucet washer replacements 75%

—with each leak eliminated, you reduce water and fuel bills up to $28.80 quarterly

Most faucet washer failures are caused by wrong length screws. 'Sexauer' Self-Locking screws* and Easy-Tite washers* —used together—cut costly washer replacements 75%! You save up to $28.80 quarterly in water and fuel alone with each leak stopped. Here's how . . .

A screw *too short* for the tapping distorts and splits the washer when tightened; the washer works loose, is torn to shreds. If *too long*, it can't grip the washer; this ruins the washer and causes hammering in the water line.

Simplifies fitting problem—cuts installation costs

'Sexauer' Self-Locking screws eliminate the problem of misfit screws. They lock *automatically* at the required depth as the nylon plug is compressed in the faucet thread. The washer is not distorted, is held firmly.

You can re-use Self-Locking bibb screws repeatedly. Made of Monel, they resist corrosion, never rust; heads won't twist off, screw driver will not distort the slot.

Self-Locking screws save time spent in fitting the proper length—10 sizes do the work of 37! Used with new, Fiberglas-reinforced 'Sexauer' Easy-Tites, they cut washer replacements 75%, fixtures last longer. Easy-Tites resist closing squeeze and excessively hot water, outlast ordinary washers 6 to 1!

Water and fuel savings

One dripping faucet wastes 8,000 gals. of water yearly. A pinhole size stream increases waste to 8,000 gals. in a *single month!* Here is what you save *quarterly* in stopping just *one* pinhole leak on a hot water faucet:

Fuel Saving		Water Saving	Total Saving
Oil (198 gals.)	$22.77	$6.03	$28.80
Coal (2,469 lbs.)	22.22	6.03	28.25
Gas (21,103 cu. ft.)	21.20	6.03	27.23

Save water, fuel and labor costs; conserve costly fixtures by cutting washer replacements 75%! Use *new* 'Sexauer' Self-Locking screws and Easy-Tite faucet washers. *You save every time you do!*

WRITE FOR CATALOG. New 'Sexauer' Self-Locking screws and Easy-Tite washers are just part of the line of over 3,000 'Sexauer' Triple-Wear plumbing repair parts and patented precision tools. Send for our new, 126-page Catalog H. *Write today!*

*Reg. U. S. Pat. Off.

J. A. SEXAUER MANUFACTURING CO., INC. Dept. 916
2503-05 Third Avenue, New York 51, N. Y.

SEXAUER
WORLD'S LEADING SPECIALISTS IN PLUMBING AND HEATING REPAIR PARTS

For more facts circle 522 on Reply Card

BACKTALK

glass particles piercing the skin of the operators' hands and other sections of the body that might contact the grinding swarf. A secondary complaint centered around the tools themselves.

"We recommend that fiber glass be sanded in the presence of a fine mist of water which prevents the grinding swarf from becoming airborne and causing operator complaints and tool breakdowns.

"Ingersoll-Rand developed a special sander with a hollow spindle for us, which threw a controllable stream of water through the center of the sanding pad onto the working surface. This machine is very effective.

"I am asking R. E. Heilman of Ingersoll-Rand to assist you with this particular problem."

Landscaping Article Helpful

PLANT ENGINEERING:

"Thank you for the fine article by R. F. Williams entitled 'Grounds Maintenance—Mechanization Reduces Operating Costs.' I'd like to see more articles like it.

"Here in the South, new plants springing up around the cities need articles like this and also on soil conservation in connection with care of grounds for future industrial expansion." *Karl Mollenhauer, Greenville, South Carolina.*

Compressed Air Systems

PLANT ENGINEERING:

"We are attempting to find an article which we believe appeared in either PLANT ENGINEERING or *Power Engineering* several years ago.

"It was a discussion of the pro's and con's of centralized versus decentralized compressed air systems. We would be grateful if you could tell us in what issue this appeared." *J. E. Yourison, Campbell Soup Co., Camden, New Jersey.*

► The article you have in mind is: "Compressed Air Systems—Which One Will Serve You Best?" It appeared in the February, 1952 issue of PLANT ENGINEERING, and luckily we still have some tear sheets available. We are sending you a set with the compliments of the editorial department.—*Editors.*

Jobs for Solids Pump?

PLANT ENGINEERING:

"The article 'Pump Handles Solids with Kid Gloves,' in the July, 1955 issue of PLANT ENGINEERING described a new type pump used for pumping solid material without bruising or damaging the materials being pumped.

"We would greatly appreciate your having the manufacturer furnish us with more information showing the construction details of this pump. We are particularly interested to see if it can be utilized for pumping spent mash in our breweries." *Charles M. Nohavec, Staff Engineer, Falstaff Brewing Corp., St. Louis, Missouri.*

PLANT ENGINEERING:

Will you kindly send us information on the solids pump as per your article on page 111 of the July issue.

"We would like information as to capacity, heads, materials of construction, horsepower required and the ability of the pump to handle highly abrasive materials and wood pulp slurries." *R. E. Simkins, Nekoosa-Edwards Paper Co., Port Edwards, Wisconsin.*

► We have called the above inquiries to the attention of the manufacturer of this pump, Western Machinery Co., 760-766 Folsom Street, San Francisco, California.—*Editors.*

Floor Care Bulletin

PLANT ENGINEERING:

"Kindly send us at your earliest convenience one copy of the booklet 'How to Care for Your Floors' as described in the October, 1955 issue of PLANT ENGINEERING." *Donald M. MacLeay, Safety Engineer, Corbetta Construction Co., Inc., New York, N. Y.*

► Your request, along with several hundred we have received has been forwarded to Paul Sawyer, S. C. Johnson & Son, Inc., Racine, Wisconsin.—*Editors.*

Wants Photo for His Files

PLANT ENGINEERING:

"Your August, 1955 issue carried an article entitled 'Self-Testing Standby Unit,' describing an emergency power generator at Marineland of the Pacific.

"The lead photo shows a Bristol recorder monitoring the test runs. We would like to obtain a print of this photo for our files. If you still have the photos used in the article, we would appreciate your sending us a print. If not, could you give us the name of the individual at Marineland, and his address, so that we might write direct to him?

"Naturally, in any case, no public use will be made of the photo or information without first obtaining specific approval from the proper parties." *H. W. Mattson, Bristol News Service, The Bristol Co., Waterbury, Connecticut.*

► We are able to supply you with the print we used.—*Editors.*

OVERHUNG ROTOR DESIGN

simplifies compressor installation and eliminates outboard bearing alignment problems

1 **PERMANENT, BUILT-IN ALIGNMENT**
Rotor support bearing cast integral with crankcase.

2 **NO OUTBOARD BEARING**
No alignment problems.

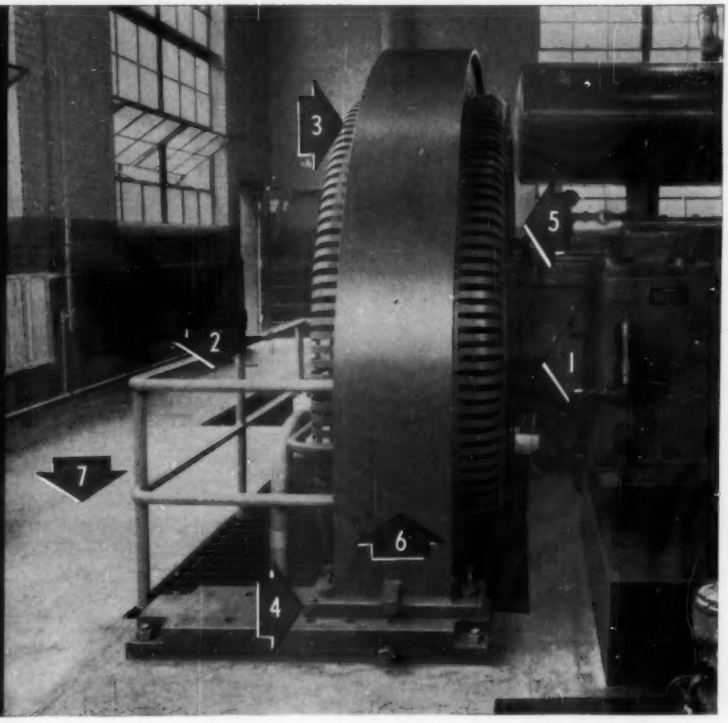
3 **FLOATING ROTOR**
While operating, rotor weight is supported on a cushion of magnetic force.

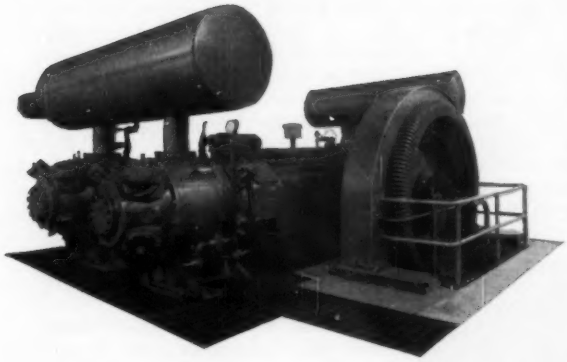
4 **EASE OF INSTALLATION AND MAINTENANCE**
Just set the stator down and slide it in place.

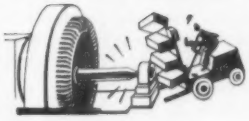
5 **NO FLYWHEEL REQUIRED**
Flywheel effect built into rotor.

6 **ONE-PIECE STATOR**
Elimination of stub shaft and outboard bearing permits use of one-piece stator and collector rings.

7 **SAVES FLOOR SPACE**
Close coupling reduces foundation size and floor area.







One of the many exclusive features of Clark Balanced/Opposed Compressors is the overhung rotor design.

With it, compressor installation is greatly simplified, floor space requirements are substantially reduced and alignment problems (inherent with outboard bearings) are non-existent. Furthermore, elimination of the outboard bearing precludes bumping it out of alignment.

When the unit is operating, the magnetic lines of force fully support the rotor, with practically no weight carried by the integral bearing or shaft. Alignment is permanently built into Clark Balanced/Opposed Compressors.

For complete details on America's first and foremost Balanced/Opposed Motor-Driven Compressor — the compressor with *perfect balance* — write for Bulletin 118 and consult with your nearest Clark representative.

CLARK BROS. CO. • OLEAN, N. Y.

ONE OF THE DRESSER INDUSTRIES

Sales Offices in Principal Cities throughout the World

PRECISION BY THE TON

CLARK **balanced/opposed compressors**

150-4500 HP

For more facts circle 523 on Reply Card

PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Edited by Marjorie E. Weissman

Storage and Care of Gloves for Electrical Workers

RUBBER GLOVES for electrical workers are designed to give adequate protection against electric shock on circuits up to 5,000 volts. However, the gloves must be of correct type and in a safe condition.

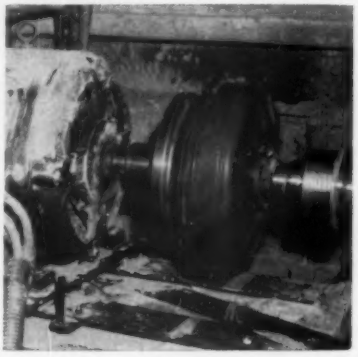
Gloves used by electrical workers should be made only of first quality natural rubber. If properly stored and cared for, they will last many years, otherwise they may deteriorate rapidly and become unsafe for electrical work.

To protect rubber gloves against cuts and snags, workers should wear leather gloves over them. When stored, gloves should be kept in a cool dark place. They should not be placed close to high tension electric apparatus, because ozone generated by such apparatus is harmful. Exposure to oil or grease should be avoided.

If gloves are stored for more than six months, they must be examined carefully and tested for leakage current before being issued for use. Gloves in service should be retested in this manner after each month of service. The date of each test should be stamped on the glove. It is important that every glove be tested, not only a certain percentage. *From Bureau of Ships Journal, published by Dept. of the Navy, Washington, D. C.*

Fluid Drive Cures Crusher Ills

MAINTENANCE costs on a secondary crusher were amounting to $3000 a year at a chemical company. The trouble was traced to the mechanical connection on the crusher. Uneven loading was pulling the motor down to a stall condition where it delivered locked-motor torque and caused severe damage to the crusher.



Fluid drive on secondary crusher has saved $3000 a year maintenance costs

A fluid drive connection was installed between the 100 hp motor and the crusher. Now, a smooth, automatic, fluid "slip" absorbs the shocks, prevents the motor from pulling down and, at the same time, allows it to pick up the load gradually. *From Production Load, published by Twin Disc Clutch Company, Racine, Wis.*

Acrylic Paint Takes to Refrigeration

COMBINATION of high humidity and low temperature is a major cause of poor adhesion of paint in refrigerated and freezer areas, where relative humidity is 80 to 100 per cent almost continually.

In most instances, poor adhesion of paint can be traced to two factors. First, most commonly-used synthetic-resin paints cure as they dry. Thus, when drying is slowed down by high

(Continued on page 32)

Silicon Treatment Prevents Grease Seepage In Gas Holder, Improves Appearance

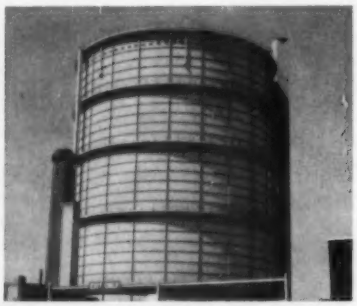
SEVERAL YEARS AGO, a Michigan power company installed a new gas holder of the type which consists of a round steel shell of riveted construction with a floating piston. The piston moves up and down inside the shell according to amount of gas in holder.

Gas is prevented from escaping from the holder by means of a grease seal that continually greases the inside of the shell as the piston moves.

In the construction of the holder, sheet lead was used for gasketing between the plates and the angle iron that joins the plates.

After completion, the holder began to show considerable grease leakage on the outside as a result of the grease being forced past the lead gasketing which had been distorted due to stresses. The grease ran down the side of the holder in an unsightly manner.

Seepage of grease through painted seams made unsightly stains on holder



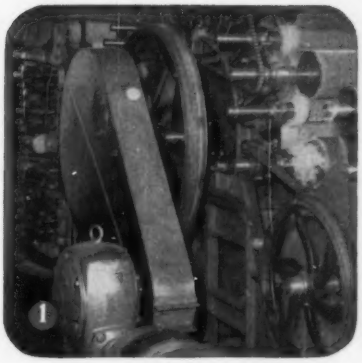
Red glyptal treatment stopped grease leakage. Holder looks like this today

In an attempt to reduce the leakage, an application of red glyptal was made on some of the seams. They were first cleaned with a solvent and brushed with an etching liquid to give a better bond between the steel and glyptal. This treatment was approximately 75 per cent effective.

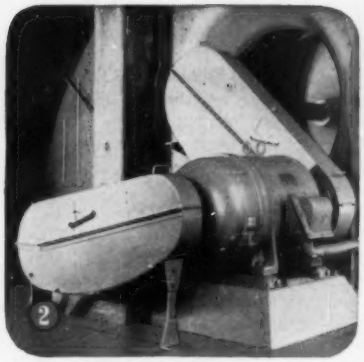
A contractor, engaged to finish the work, used compressed air to spray the cleaning solution into the seams and to blow excess cleaner and residual grease out of the seams.

The etching compound and red glyptal were also sprayed on. Since there was still considerable leakage after this treatment, paint blisters along the seams, that might trap grease, were broken. This job was 85 per cent successful.

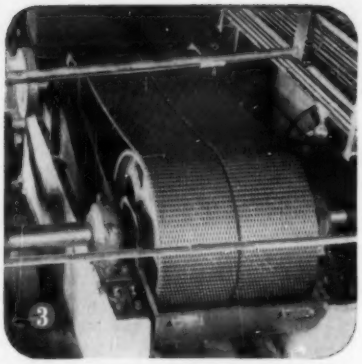
Subsequent breakage of all outside paint surfaces capable of trapping grease, followed by suitable cleaning, successfully completed the job of removing and preventing grease seepage stains. *From American Gas Association Monthly, published by American Gas Association, New York, N.Y.*



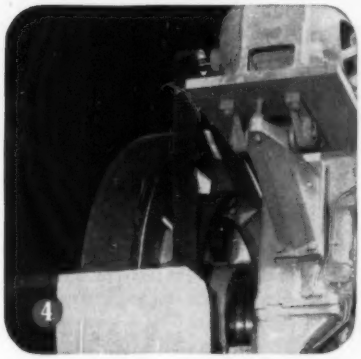
1 ADVERSE OPERATING CONDITIONS. Humidity, heat, cold do not lower Link-Belt Silent Chain's better-than-98% efficiency.



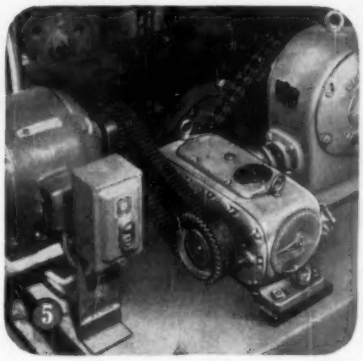
2 UNFAILING SAFETY. Dependability assures continued production. On above tunnel ventilators, Link-Belt drives protect human life.



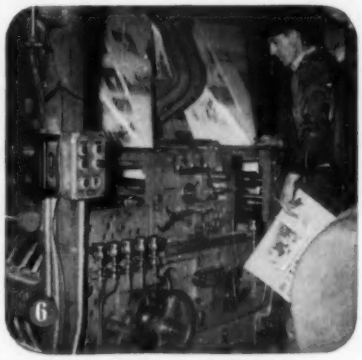
3 LARGE OR SMALL HP. A versatile line, Link-Belt Silent Chain drives are available from fractional to thousands of horsepower.



4 LARGE RATIOS. Link-Belt Silent Chain operates efficiently on extremely short centers at ratios as high as 10-to-1.



5 LIMITED SPACE. Easy to assemble in close quarters, Link-Belt Silent Chain permits built-in drives, compact housings.



6 HIGH SPEED. After 13 years on this newspaper press at speeds up to 4700 fpm, Silent Chain is still efficient.

Big reasons why LINK-BELT Silent Chain

is specified for so many drives:

WHEN using a Link-Belt Silent Chain Drive, you can look forward to better-than-98% efficiency throughout its long operating life. What's more, silent chain offers the sureness of positive tooth-to-tooth action plus the flexibility of a belt. As for economy, silent chain is often lower in cost than other drives far less efficient.

Find out for yourself why so many of today's demanding drives incorporate Link-Belt Silent Chain. Ask your nearest Link-Belt office or distributor for Book 2425, containing complete information.

LINK-BELT

SILVERSTREAK SILENT CHAIN DRIVES

Here's why LINK-BELT Silent Chain offers you more drive per dollar

- Lower cost—often lower in first cost, always lower in ultimate cost.
- Longer life—trouble-free performance for 20 to 30 years is common.
- No dismantling machine or removing sheaves for repairs.
- Better than 98% efficiency.
- Maintained ratio assures full productive capacity.
- Slipless action assures a better product.
- Easy to install.
- Safe to employees—operates in oil-retaining casing.

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 19,710

For more facts circle 524 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

humidity or low temperatures, the strength and adhesion of the paint film is reduced. Second, under moist conditions, pockets of water form under the paint film, causing blistering and peeling.

These problems cropped up in the refrigerated and freezer storage rooms at a New York hotel which has five such rooms maintained at temperatures ranging from 0 F to 55 F. These rooms have plaster ceilings, which formerly were painted with a white alkyd enamel for appearance and brightness.

Because these rooms supply the hotel's kitchens, when the time came for repainting, they could not be kept out of service long enough for the ceilings to dry adequately before the paint was applied or for the paint to dry completely afterwards. Usually the refrigeration equipment was shut off temporarily, the ceiling was painted, and after a few hours wait to permit some drying, the room was returned to service.

As a result, the alkyd paint film dried and cured at a very slow rate. After three or four months' time, the surface again began to peel.

In an attempt to get better paint performance under these conditions, a paint, called Macrylic plastic coating, based on an acrylic emulsion, was used in a refrigerated room.

The acrylic paint was applied on a moist surface under the same conditions as was the enamel, and is intact except for a few spots. In those places, some peeling has occurred because the underlying paint has become loosened. Nevertheless, over the entire area the acrylic paint has, so far, lasted twice as long as did the other paint under the same conditions.

Acrylic paint on ceiling of refrigerated room is in good condition months after its application, despite high humidity

The improved adhesion is largely attributable to the properties of the acrylic film. Moisture under the paint can pass through it instead of being trapped under the film to form water pockets which blister the film and

(Continued on page 35)

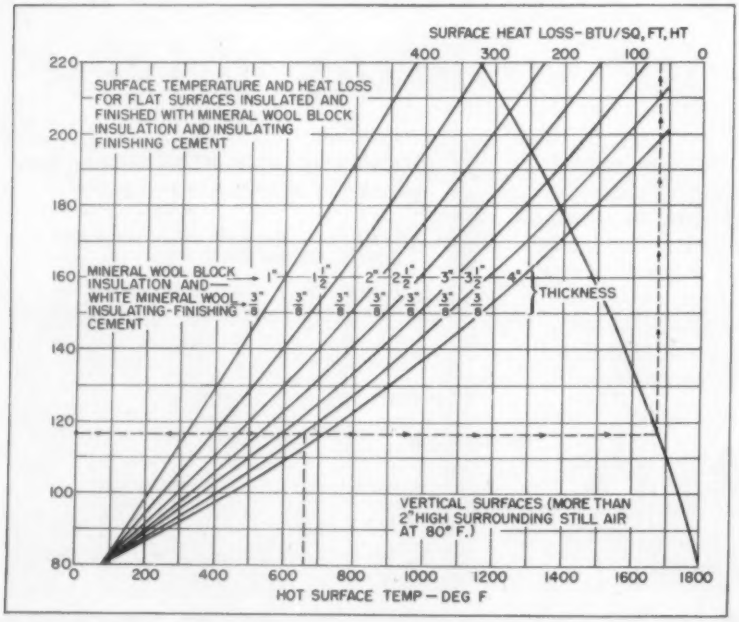
Specifying Graph Gives Heat-Loss Data For Block and Cement Insulation

The combination of mineral wool block insulation and a white insulating-finishing cement is becoming a frequent specification for the heated flat surfaces of ductwork, hoppers, fan housings and other plant equipment.

Accurate heat-loss data is helpful in evaluating the insulating performance of the block-and-cement combination and in establishing thickness-temperature specifications.

Repetitive calculations to determine outside surface temperature (deg F) and surface heat loss (Btu/sq ft, hr) for various thicknesses of mineral wool block insulation and a standard 3/8-in. thickness of white mineral wool insulating-finishing cement can be eliminated by use of a heat-loss graph.

Standard thicknesses of block insulation from one to four inches are given: The graph covers hot-surface temperatures up to 1700 F (the recommended limit for the block material) and outside surface temperatures as high as 220 F.



Heat-loss data is helpful in evaluating the insulating performance of cement

Insulation thickness specifications, on the basis of operating economy, are derived from limits on either outside surface temperature (left-hand scale) or on surface heat loss (top scale). For each hot-surface temperature, the block insulation thickness which, with the 3/8-in. coat of insulating-finishing cement, will meet requirements can be determined. The graph can also be used to evaluate the performance of block-and-cement insulation already applied.

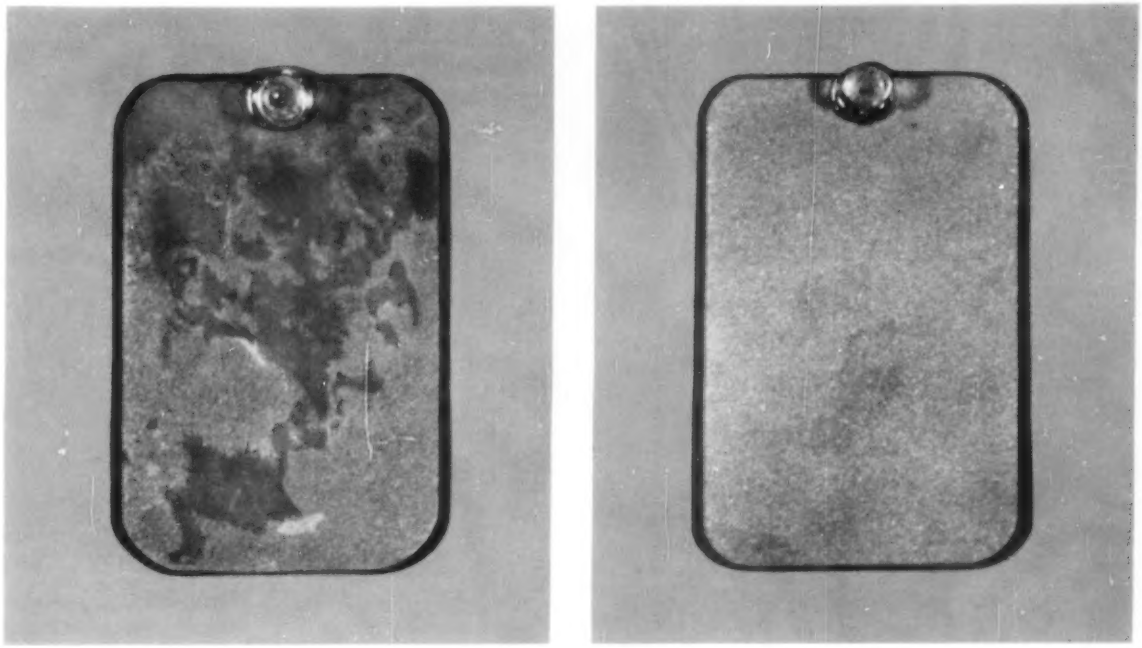
In using the graph to determine the insulation thickness required on a 660 F preheated air duct, for example, a vertical line drawn up from 660 F on the hot-surface temperature scale at the bottom intersects the block thickness line for 3½-in. as shown.

A horizontal line from this intersection to the left-hand scale shows that for these conditions the outside surface temperature will be about 116.5 F.

A vertical line from the intersection of the horizontal line with the curve at right meets the surface heat loss scale at top right at 62 Btu/sq ft, hr, the heat loss which may be expected from the insulated air duct.

The graph also shows that if a surface temperature of 130 F or a heat loss of 100 Btu/sq ft, hr is permitted, the thickness of the block may be reduced to 2½ in. *From a release of Baldwin-Hill Company, Trenton, N.J.*

For more facts circle 525 on Reply Card



Efficiency of New Sun Rust-Preventive Grease is shown by accelerated test. Rusted test plate (left) was coated with ordinary grease. The large amount of rust was formed during a 48 hour immersion in synthetic sea water. Plate (right) protected by new Sun rust-preventive grease is wholly rust free after 48 hours.

NEW GREASES PREVENT HARMFUL RUST

Sun rust-preventive greases give improved lubrication ...protect against wet or humid operating conditions

In 48 Hour Synthetic Sea Water Test, rust from plate coated with ordinary grease has turned water yellow (left). Water remains crystal clear in beaker with plate protected by new Sun rust-preventive grease (right).

Water contamination in grease-lubricated parts reduces lubricant life, promotes corrosive wear, and may lead to failure of bearing surfaces.

Sun Oil's new rust-preventive greases are specially fortified to overcome this problem. They give extra protection against both direct water contamination and indirect water contamination caused by high humidity and condensation during overnight and week-end shut downs.

Available at the price of ordinary greases, new Sun rust-preventive greases come in many different grades. For complete information, see your Sun representative, or write for Sun Technical Bulletin 38. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. GI-1.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO & MONTREAL

SUNOCO

PLEASE TURN TO NEXT PAGE

New buttery grease now protects against rust under highly adverse moisture conditions.

New tacky grease prevents throw-off... reduces consumption. Highly resistant to water.

New high-temperature grease for anti-friction bearings. Exceptional stability, longer life.

NEW SUN RUST-PREVENTIVE GREASES SAVE YOU MONEY IN 3 WAYS

- **Prevent wear... and rust... on 90% of all grease jobs**
- **Serve as low-cost rust preventives for storing shop equipment**
- **Save storing and handling special-purpose greases**

Sun Oil Company's new greases are fortified to protect against rust. Lubricity is improved and wear is reduced because grease-lubricated parts are now protected at all times against rust and corrosion caused by condensation and process water.

The effective life of these new rust-preventive greases is approximately twice that of conventional greases operating under wet conditions. And, their extra protection against moisture permits their use as a rust-proofing medium for shop storage of tools and parts.

Competitively priced with ordinary greases, these new greases can be applied by any conventional method... brush, swab, pressure gun, or through central pressure systems.

Because of their improved quality, these new Sun greases will now perform 90% of all grease lubrication jobs. You reduce grease inventories ...lessen the risk of using the wrong grease... simplify your handling problems.

For complete information, see your Sun representative or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. GI-2.

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY, PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

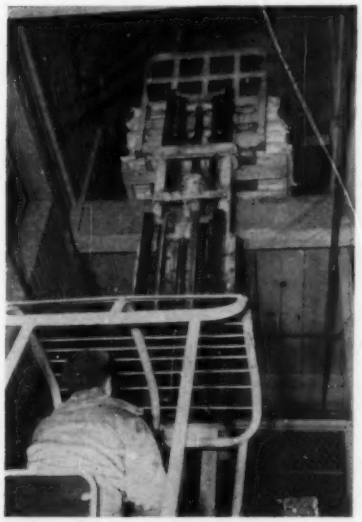
eventually cause peeling. For this reason acrylic paint can be applied over "green" plaster to make as good a job as if the plaster were completely dry.

Another advantage of acrylic paint, when used in food-handling, dining or confined or poorly ventilated areas, is that it has a barely detectable odor which disappears completely within 30 minutes. The paint is also being used in the hotel for periodic repainting of guest rooms, corridors and other public spaces. *From a release of Rohm & Haas Company, Philadelphia, Pa.*

Gad-About "Elevator"

BARRELS, BAGS and drums of raw materials used for industrial water treating products, used to be carried by a 2000 lb capacity elevator to the second floor of the W. H. and L. D. Betz Company, Philadelphia, Pa. Scale hoppers fed the material to chemical mixers immediately below, on the first floor.

Located at the rear of the building, the elevator was some distance from the storage area and hoppers, and as



Double uprights on fork truck enable load to be hoisted easily to second floor eliminating the need of an elevator

facilities grew, this method of moving supplies became slow and inefficient.

A novel "elevator," located convenient to the weighing apparatus and storage area, was installed by the plant superintendent, Andy Olsen. He cut a hole, six feet square, in the second floor. This provided the "elevator"

Pangborn Dust Control

Saves $14,000 a year for Woodall

The Long Island plant of Woodall Industries, Inc., had a serious problem. Fabricating Masonite for its hundreds of products released so much dust that, without efficient dust control, work would be practically impossible. So Woodall installed a Pangborn Dust Control system.

The result? The dust collected not only leaves the plant dust-free but provides *all* the fuel for heating and processing requirements. Savings on fuel bills amount to $14,000 a year! Pangborn Dust Control at Woodall pays its own way *with a profit* for the firm.

Pangborn can solve *your* dust problem. Pangborn engineers will be glad to show you how Pangborn Wet or Dry Dust Collectors can save you time, trouble and money!

See how Pangborn benefits varied industries. Write for free copy of "Out of the Realm of Dust." Pangborn Corp., 3200 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control and Blast Cleaning Equipment.*

Pangborn CONTROLS DUST

For more facts circle 526 on Reply Card

"I hopped a plane at midnight . . . to answer a call for help!"

"This true story is typical of the expert know-how you may expect from the Skellyfuel people . . ."

"The shrill ring of the bedside phone awakened me at 11:03 p.m. It was long distance, from a midwest utility company. A crisis! Their LP-Gas system was operating erratically and threatening to shut off the town gas supply. Although Skellyfuel hadn't installed their equipment, they had heard of our trouble-shooting 'know-how.' They needed help at once.

"In just two hours I got off the plane, and hurried to the gas plant, and gave the equipment a thorough check.

"Within an hour, the trouble was found to be caused by improperly installed controls. With the assistance of the plant superintendent, the necessary changes were made. With the trouble corrected, the plant quickly resumed proper operation."

Even though you may never have had an LP-Gas problem like this, it's good to know that you can call on the expert LP-Gas Skellyfuel specialists. With Skellyfuel, LP-Gas and gas systems are not just a sideline. We've specialized in it—pioneered it, in fact—for over 25 years.

No other company gives you a more complete service than Skelly Oil Company. Our integrated services include: (1) analyzing your needs; (2) designing and constructing your fuel system; and (3) *supplying the highest quality LP-Gas available.*

For a more complete story of Skellyfuel and how Skellyfuel's integrated services may assist you, phone us today or write for our 20-page color booklet.

SKELLY

Skellyfuel

SKELLY OIL COMPANY

Industrial Division

605 West 47th Street • Kansas City 41, Missouri

For more facts circle 527 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

shaft. A standard model, 5000 lb capacity fork truck, equipped with double uprights, provided the elevator. Fully extended, the forks can raise a load 15 ft 6 in., or high enough to reach the second floor. With the forks lowered, the truck can pass through any door in the plant.

Now, when a call comes from the second floor weighing room for raw materials, they are transported by the fork truck to the new elevator shaft, then lifted and deposited onto the second floor. There, a hand pallet truck is used to carry the pallet to the hoppers. In this way, 50 tons of material can be transported from the first to second floor in three hours. Formerly, four or five men required a full day to do the job.

When not in use as an elevator, the truck is used for loading outbound trailer trucks and as a ladder for maintenance work such as changing light bulbs and washing windows. *From Material Handling News, published by Clark Equipment Company, Battle Creek, Mich.*

Pallet Flattener Keeps Doughnut Mix in Line

ONE-HUNDRED-POUND bags of doughnut mix were causing a warehousing problem for the manufacturer. As the bags come from the filling machine, they are oval in cross section and when palletized produced an uneven load. When the load settled it would lean precariously.

Doughnut mix, flattened under platform by pallet load, stacks more safely

High costs prohibited flattening the

For more facts circle 528 on Reply Card →

ACCO products

WRIGHT Electric Hoists for Top Production, Easiest Maintenance

WRIGHT *Speedway* Electric Hoists—Frame 1, Frame 2 and Frame 3—are ideal **HOISTS** for handling production materials where the load requirements **ARE** from ¼ ton to 10 ton capacity. Their design includes many advanced **SAFE** operating features. Sound choice of components provides them with **EFFICIENT** balance for smooth running. Parts are designed and built to give **RUGGED** performance with a minimum of care. Plant operating men find them **ADAPTABLE** to almost every type of shop work because of the wide range of speeds, lifts and mountings.

The more particular you are in your selection of hoisting equipment—the more likely you are to choose WRIGHT

Write our York, Pa., office for any or all of these fully informative bulletins—

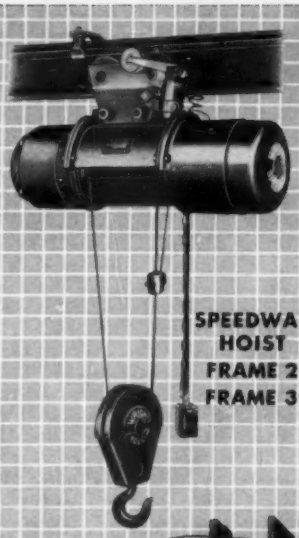
Bulletin DH-133B on Frame 1 and 1½ WRIGHT Speedways
Catalog E-54A on Frame 2 and 3 WRIGHT Speedways
Bulletin DH-504 on WRIGHT Electric Roller Chain Hoist

ACCO

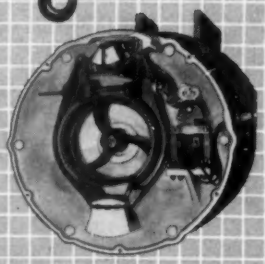
Wright Hoist Division
AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

for Better Value



SPEEDWAY HOIST
FRAME 2
FRAME 3



MOTOR BRAKE & SOLENOID
FRAME 2 and FRAME 3 HOIST
"Nothing to adjust but the cam!"

WRIGHT
Electric Roller Chain Hoist

- ¼, ½, 1 and 2-ton capacities
- Fewest number of wearing parts
- Self-locking, double-worm gear acts as own load brake
- Spring-set, shoe-type motor brake, clam shell type
- Oversize precision ball bearings
- Forged steel-alloy hook, swings and swivels

COMPETITIVELY PRICED

SPEEDWAY HOIST
FRAME 1
(also FRAME 1½)

THIS DOUBLE-WORM GEAR ELIMINATES TROUBLESOME LOAD BRAKES

MOTOR BRAKE
FRAME 1 and FRAME 1½
"Nothing to adjust but the cam!"

No break-down stoppages here!

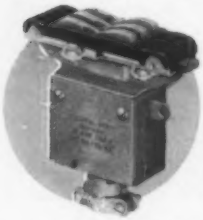
THANKS TO...

FEEDRAIL® Trolley Busways

As long as the source of power stays alive, FEEDRAIL will provide safe, sure and continuous electric power to this crane and hoist. That's because FEEDRAIL is the dependable way to electrify moving equipment such as this.

FEEDRAIL trolley busways eliminate the problems and troubles of open wiring and long, trailing power cables. Power is taken off through easy rolling trolley outlets. Both the current-carrying bus bars and the trolley contacts are protected by sturdy steel housings. There's no chance of broken conductors suddenly interrupting operation — and there's virtually no maintenance. The entire installation is compact, out of the way, and trouble-free.

With its straight, curved and transfer track sections, FEEDRAIL can be readily adapted to any materials handling layout. Systems are available in capacities ranging from 60 amperes for budget hoists up to 500 amperes for big tonnage traveling cranes.



SPECIAL SERVICE TROLLEYS FOR BUDGET HOISTS

These 20 ampere trolleys have been especially developed to allow 60 ampere FEEDRAIL systems to be used for continuous or heavy duty service on budget hoists and light tonnage monorails. Full information on request.

GET THE FACTS

Descriptive literature showing how FEEDRAIL can be used to make crane and hoist operation faster, safer and more dependable is available on request. Write Dept. P-1.

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FEEDRAIL CORPORATION

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For more facts circle 529 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

bags individually, so a second solution, that of flattening the entire pallet load, was investigated. As a result, a platform was built and installed for $250.

The platform consisted of a five-foot square angle iron frame covered with 3/16-in. steel plate. This was fastened to 3-in. channel sections, which, in turn, were bolted to the wall. The platform was reinforced with two 2-in. square tube braces set at a 45 deg angle.

To flatten the bags, a fork lift truck operator positions the pallet load under the steel plate, lifts the load until the bags are depressed by the plate, lowers it, then takes it to the warehouse. The flattened bags make a straight, even stack, with a minimum of effort on the part of the truck operator.

Faster stacking, maximum use of warehouse space and greater safety have resulted from the use of the flattening platform. In addition, about $1,150 was saved in one year from reduction in damage to bags. *From Technical Bulletin, published by General Foods Corporation, White Plains, N. Y.*

Presses Bounce On Special Mounts

DUAL ISOLATORS, each with a load capacity of 13,000 lb, placed under each leg of a 100-ton punch press,

Punch press is mounted on dual isolators, obviating need for special flooring

have eliminated the need for a special concrete floor.

The isolators absorb the impact shock, preventing damage to the floor

How
ROCKWELL-
Nordstrom
VALVES

Cut Your Processing Costs

For more than forty years, Rockwell-Nordstrom *lubricated* plug valves have been proving that they cut costs by doing their job better, longer, with less maintenance. Here's why:

1. Pressurized lubricant forms a positive, leakproof seal, preventing dangerous or costly leakage.
2. Metal-to-metal friction is eliminated by lubricant. Maintenance, repair and down time costs are slashed on even the toughest service.
3. Costly production loss by stuck valves is prevented. The tapered plug is hydraulically seated for *instant, quarter-turn* operation.

Rockwell-Nordstrom valves cost about the same, often less, than ordinary valves. Their cost to use and trouble-free dependability cannot be matched by any other valve. Available in semi-steel, steel, stainless and corrosion resisting metals, in a full range of sizes to 30". Send the coupon today for complete details.

Canadian Valve Licensee: Peacock Brothers Ltd.

40th YEAR

of lubricated plug valve leadership

ROCKWELL-
Nordstrom
VALVES

Lubricant Sealed for Positive Shut-off

For more facts circle 530 on Reply Card

ROCKWELL MANUFACTURING COMPANY, Pittsburgh 8, Pennsylvania

☐ Please send me Bulletin V-215.

☐ Please send me name of nearest Rockwell-Nordstrom industrial distributor.

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____

No break-down stoppages here!

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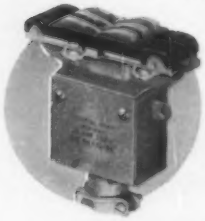

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PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

bags individually, so a second solution, that of flattening the entire pallet load, was investigated. As a result, a platform was built and installed for $250.

The platform consisted of a five-foot square angle iron frame covered with 3/16-in. steel plate. This was fastened to 3-in. channel sections, which, in turn, were bolted to the wall. The platform was reinforced with two 2-in. square tube braces set at a 45 deg angle.

To flatten the bags, a fork lift truck operator positions the pallet load under the steel plate, lifts the load until the bags are depressed by the plate, lowers it, then takes it to the warehouse. The flattened bags make a straight, even stack, with a minimum of effort on the part of the truck operator.

Faster stacking, maximum use of warehouse space and greater safety have resulted from the use of the flattening platform. In addition, about $1,150 was saved in one year from reduction in damage to bags. *From Technical Bulletin, published by General Foods Corporation, White Plains, N. Y.*

Presses Bounce On Special Mounts

DUAL ISOLATORS, each with a load capacity of 13,000 lb, placed under each leg of a 100-ton punch press,

Punch press is mounted on dual isolators, obviating need for special flooring

have eliminated the need for a special concrete floor.

The isolators absorb the impact shock, preventing damage to the floor

How
ROCKWELL-
Nordstrom
VALVES

Cut Your Processing Costs

For more than forty years, Rockwell-Nordstrom *lubricated* plug valves have been proving that they cut costs by doing their job better, longer, with less maintenance. Here's why:

1. Pressurized lubricant forms a positive, leakproof seal, preventing dangerous or costly leakage.
2. Metal-to-metal friction is eliminated by lubricant. Maintenance, repair and down time costs are slashed on even the toughest service.
3. Costly production loss by stuck valves is prevented. The tapered plug is hydraulically seated for *instant, quarter-turn* operation.

Rockwell-Nordstrom valves cost about the same, often less, than ordinary valves. Their cost to use and trouble-free dependability cannot be matched by any other valve. Available in semi-steel, steel, stainless and corrosion resisting metals, in a full range of sizes to 30″. Send the coupon today for complete details.

Canadian Valve Licensee: Peacock Brothers Ltd.

40th YEAR

of lubricated plug valve leadership

ROCKWELL-
Nordstrom
VALVES

Lubricant Sealed for Positive Shut-off

For more facts circle 530 on Reply Card

ROCKWELL MANUFACTURING COMPANY, Pittsburgh 8, Pennsylvania

☐ Please send me Bulletin V-215.

☐ Please send me name of nearest Rockwell-Nordstrom industrial distributor.

Name_____ Title_____

Company_____

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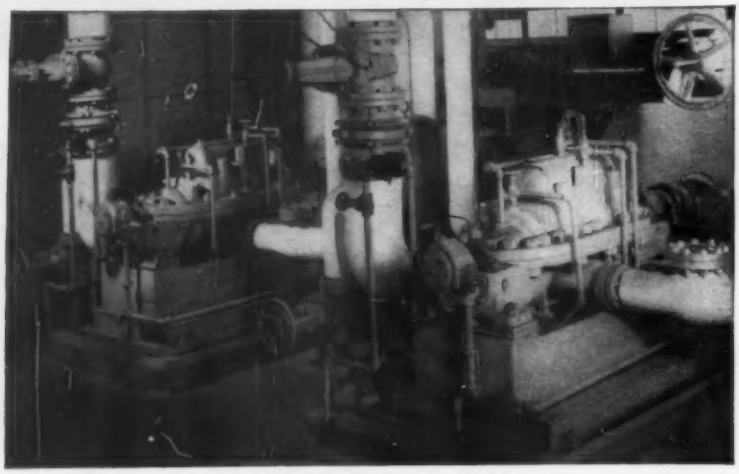
PRODUCTION CONTINUITY

Begins in the Boiler Plant



Warren Six Stage Boiler Feed Pumps installed at a Southern Board and Paper Mill.

Boiler Feed Pumps may look much alike, type for type, but it is well to keep in mind such intangible factors as:

- Experience and integrity of the manufacturer
- Dependability of product
- Know-how, Workmanship, Service
- Maintenance and Repairs
- Lost production due to down-time
- Early replacement because of "tight" original recommendations

It is impossible, of course, to get these items into your "specs," or the supplier into his "quotes," but don't overlook their importance with relation to price, possible future requirements and *production continuity*.

Get your share of "intangibles" . . . specify

WARREN QUIMBY PUMPS

P-31

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC.

Warren, Massachusetts

For more facts circle 531 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 30)

and transmission of the force to other machines on the floor. Had the isolators not been used, a concrete slab approximately 8 ft by 6 ft and 16 to 18 in. deep would have been necessary to absorb the shock, rather than the 5-in. deep, wire reinforced floor used. *From a release of Barry Controls, Inc., Watertown, Mass.*

Concrete Care in Hot Weather

THE ONSET of hot weather brings several problems in the pouring of concrete, among them, rapid stiffening, low strength tests and plastic shrinkage.

Rapid shrinkage will occur if no precautions are taken to control the temperature of the concrete. The setting time of concrete becomes shorter as the atmospheric temperature increases. At high temperatures concrete requires more mixing water for equal consistency than at normal temperature, and the extra water reduces its strength.

Tests conducted at a state university showed that concrete mixed at 100 F required about 3 gal per cu yd more water than concrete mixed at 73 F. As a result, a 300 psi reduction in 28-day compressive strength was obtained.

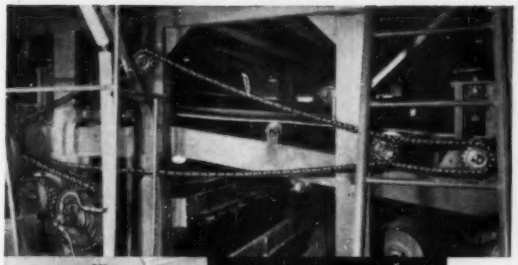
Concrete poured in exposed locations during hot weather tends to develop plastic shrinkage cracks, due to the rapid removal by evaporation, of water from the surface. This is accompanied by a correspondingly large reduction in volume.

These cracks generally appear about the time the concrete is ready for final finishing, but under severe weather conditions the shrinkage will occur shortly following the floating operation.

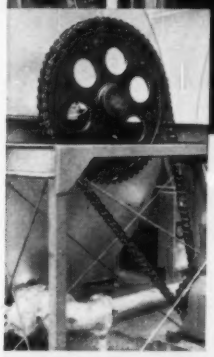
A fine fogging spray applied continuously during the critical period following floating and during final finishing, will eliminate or reduce cracking.

Once the final finishing is accomplished, the application of curing compounds will prevent further evaporation. The continued use of the water spray is recommended, particularly when abnormal atmospheric temperatures are encountered. This will prevent surface cracking due to a temperature differential between the surface and the interior of the concrete. *From This Earth, published by Permanente Cement Company, Oakland, California.*

Are Your Drive Centers Long, Short or Medium?

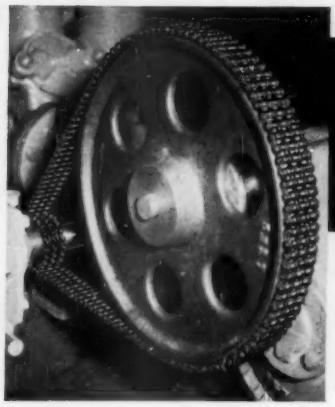


DIAMOND
ROLLER CHAINS
Provide Equally Positive Drives Regardless of Center Distances



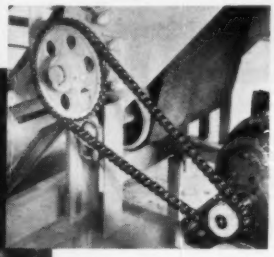
LONG CENTERS LIKE THESE?

At Top: Long distance between centers and with idler sprocket, drive gets around obstructions.
At Left: Single No. 478 Diamond Roller Chain agitator drive on 5-foot center.

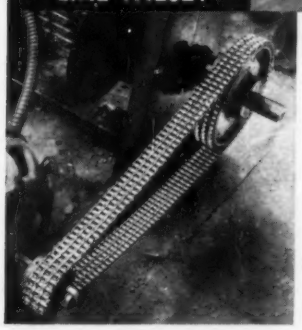


OR CENTERS SO SHORT SPROCKET TEETH BARELY CLEAR?

Short center high-speed motor drive — triple-strand Diamond Roller Chain.



OR MEDIUM CENTERED DISTANCES LIKE THESE?



Above: Drive to carton conveyor, 28-inch center distance.
At Left: Multiple-strand high speed motor drive.

■ Whether shafts are very close together or far apart—Diamond Roller Chain Drives transmit the power positively—without slip or drag.

Speeds selected or desired are accurately assured—productive output maintained at maximum, every hour of every day.

Diamond high-finish Roller Chains perform as smoothly as they look—every roller perfectly mated, cushioned in movement on films of oil. Little or no power is absorbed, with little maintenance throughout long years of useful life. Delays and replacements are avoided when you entrust your motor and machinery drives to Diamond Roller Chains.

Practical recommendations and a copy of new Catalog 754 are yours for the asking.

Write for complete data Catalog 754.

ALWAYS PRELOADED

For many, many years, Diamond Chain has been preloaded after assembly for the purpose of bringing pin-bushing seating into stabilized relationship prior to field installation.

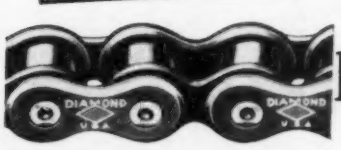
DIAMOND CHAIN COMPANY, Inc.

Where High Quality is Traditional

Dept. 614, 402 Kentucky Ave., Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER



DIAMOND ROLLER CHAINS

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G-E Convertible welding ignitrons include:

GL-5551-A	40 amp
GL-5552-A	140 amp
GL-5553-B	355 amp

G-E Temperature-controlled welding ignitrons (with built-in temperature and water regulation) include:

GL-6346	40 amp
GL-6347	140 amp
GL-6348	355 amp

New G-E Convertible welding ignitrons will operate with or without over-temperature control!

Mounting bracket for easy-to-attach thermostat has direct thermal contact with inner tube wall.

Most widely usable tubes you can buy! General Electric Convertible ignitrons are standard in operation if installed without thermostat attachment . . . burnout-protected and water-controlled when proper thermostats are included. Fully interchangeable with earlier ignitrons. Available *now* from your local G-E tube distributor!

Save by eliminating the need to double-stock ignitrons, standard and temperature-controlled types! Now one G-E tube will do both jobs.

Save by using thermostats interchangeably! If a regulated ignitron needs replacing, merely remove the thermostat and attach it to the new tube.

Priced same as welding ignitrons that have no provision for temperature control—with extra dividends in General Electric quality, reliability, and long life. Contact your G-E tube distributor today! *Tube Department, General Electric Company, Schenectady 5, New York.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

161-1C1

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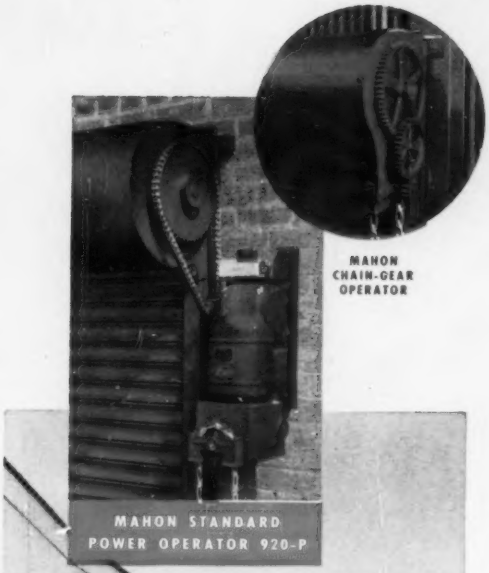
Rolling Steel Doors

Manually, Mechanically, or Electrically Operated



MAHON CHAIN-GEAR OPERATOR

MAHON STANDARD POWER OPERATOR 920-P

For any type of opening where positive protection, long life, and convenient, timesaving operation are important, the logical answer is a good power operated rolling steel door. No other type of door can match their space-saving compactness in operation . . . the vertical roll-up action of the door curtain occupies no usable space either inside or outside the opening—and, there are no overhead tracks or other obstructions to interfere with material stacking or crane handling adjacent to door openings. A quick-opening, quick-closing Mahon Power Operated Rolling Steel Door will save valuable space and valuable time in any type of opening. In addition, Mahon Rolling Steel Doors are permanent—their all-metal construction assures a lifetime of trouble-free service, and provides maximum protection against intrusion or fire . . . they require less maintenance too, because, when the door is open, the interlocking steel curtain is rolled up above the opening safe from damage. When you select a Rolling Steel Door, check specifications carefully . . . you will find extra value built into Mahon doors—for instance, the galvanized steel material, from which the interlocking curtain slats are rolled, is BONDERIZED and DIP-COATED with synthetic enamel which is baked on at 350° F. prior to roll-forming. You will find other important Mahon features, in both design and materials, that add up to a greater over-all value. See Sweet's Files for complete information and specifications, or write for Catalog G-56.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York and Chicago • Representatives in Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Closing Underwriters' Labeled Rolling Steel Fire Doors and Fire Shutters; Insulated Metal Walls and Wall Panels; Steel Roof Decks and Long Span M-Decks; Permanent Floor Forms; and M-Floors (Electrified Cel-Beam Floor Systems).

ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

In the Diesel Locomotive Roundhouse illustrated above there are fourteen 12 Ft. x 16 Ft. Mahon Rolling Doors installed in track openings. These permanent, all-metal doors replaced old wooden doors.

MAHON

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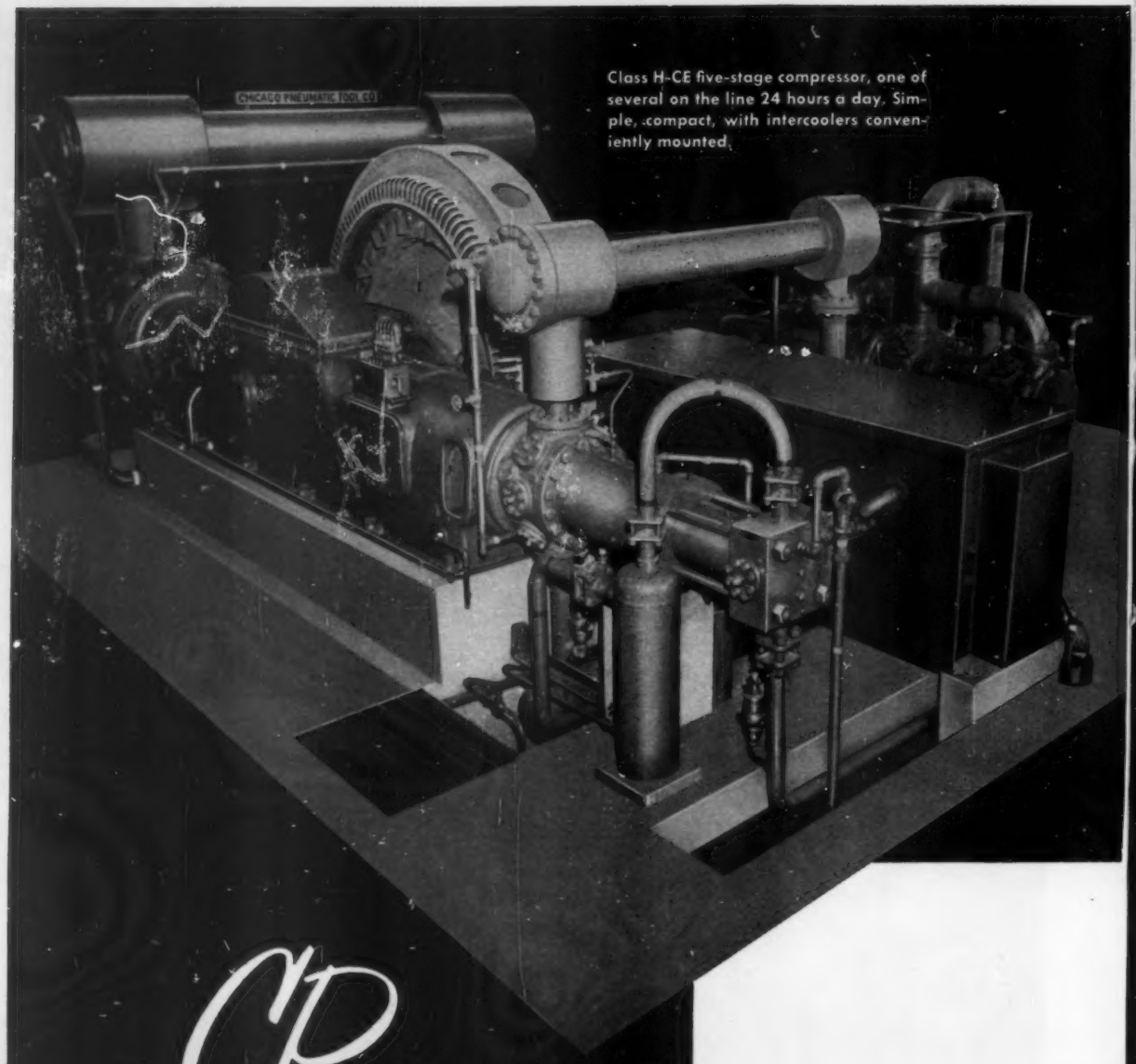


Class H-CE five-stage compressor, one of several on the line 24 hours a day. Simple, compact, with intercoolers conveniently mounted.

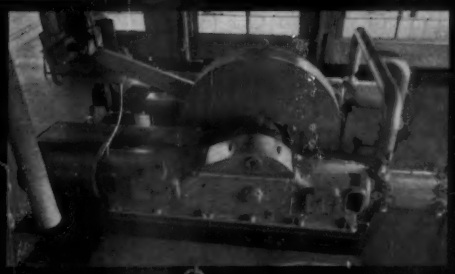
cp

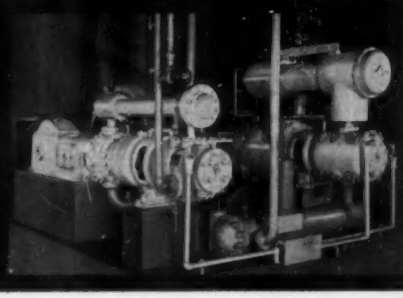
COMPRESSORS—

serving the process industries

Non-lubricated, hydrogen recycle compressor, with enclosed distance piece; electric motor-driven through gear reducer.

Class "H" steam-driven, single-stage booster compressor handling hydrocarbon gas.





Class O-CE four-stage, motor-driven compressor. Note simple arrangement of intercoolers.

• FOR PRESSURES TO 15,000 PSIG
• SIZES TO 4000 H. P.
• WITH MOTOR, BELT OR STEAM DRIVE

For process work, Chicago Pneumatic offers a complete line of electric and steam driven heavy-duty reciprocating compressors to handle most known gases.

Rugged in design and conservatively rated, they are ideal for continuous, round-the-clock duty; each engineered to specific job requirements with special materials, construction, capacity or pressure controls to suit.

24 hours a day!

Chicago Pneumatic 8 East 44th St., New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

For more facts circle 535 on Reply Card

Self-Powered
COMBINATION SCRUBBER-VAC
Cleans Vast-Area Floors "By the Mile"

Oxy-Catalyst Monoxide Eliminator and Powder Dispenser are accessories

- Cleans up to 16,000 sq. ft. per hour!
- Applies the cleanser, scrubs, and picks up—*all in one operation*
- Mounts a SELF-STARTING gasoline engine

This *all-in-one* cleaning unit, *Finnell's 218G,* is indeed the answer to today's need for increasing output per man-hour on vast-area scrubbing. *The 218G completely mechanizes scrubbing* — applies the cleanser, scrubs, and picks up — *all in one operation!* Independence from power lines permits the machine to go wherever the operator guides it . . . working in and out of production areas with ease . . . *scrubbing continuously.* Thus the *218G* is capable of cleaning up to 16,000 sq. ft. per hour!

Maintenance men appreciate the labor-saving features of this unit. The gasoline engine starts quickly and easily by pressing the starter button (eliminates rope-pulling). And there are no switches to set for *fast* or *slow*—slight pressure of the hand on clutch lever adjusts speed to desired rate (up to 136 ft. per minute). Two 18-inch brushes give a 36-inch scrubbing surface. *One engine* (2 cyl., 4 cycle, 9.4 hp., air-cooled) operates all working parts. The powerful vac performs quietly. Gasoline only is used for fuel — no mixing required. *Finnell* also offers this type of machine in a smaller size *(215G-2)* with two 15-inch brushes.

Whatever the area of your floors, find out what *you* would save with a *Combination Scrubber-Vac. Finnell* makes a full range of sizes, including *electric* as well as *gasoline* models. It's also good to know that a *Finnell Floor Specialist and Engineer is nearby* to help train your maintenance operators in the proper use of *Finnell Equipment* and to make periodic check-ups. For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 5301 East St., Elkhart, Ind. Branch Offices in all principal cities of the United States and Canada.

FINNELL SYSTEM, INC.

Originators of Power Scrubbing and Polishing Machines

Everything FINNELL for Floor Care

BRANCHES IN ALL PRINCIPAL CITIES

See the Finnell Exhibit • PLANT MAINTENANCE and ENGINEERING SHOW • Philadelphia • January 23-26 • *Space 1501*

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For more facts circle 537 on Reply Card →

Right off your Square D Distributor's shelf!

New QMB Saflex Distribution Panelboard

Exactly the Power Panelboard you want—when you want it. Your Square D Distributor stocks boxes, interiors and plug-in units which can be quickly assembled to meet virtually any specifications. Above, interior ready for easy mounting in box.

Plug-in Units are installed easily on tubular bus bars. The solid neutral can be changed in minutes. Here is flexibility that reduces "down time" and saves money.

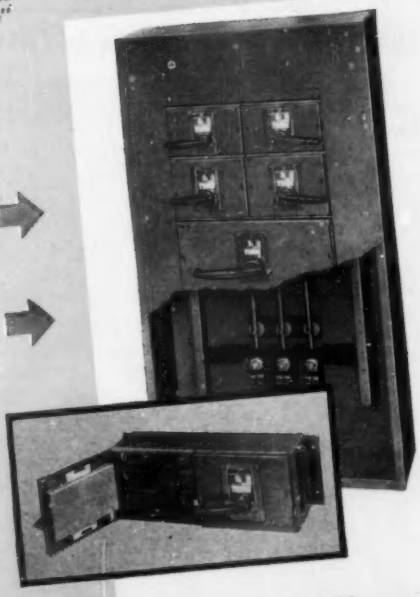
Three Simple Assembly Steps Fronts, with adjustable trim clamps, are available with or without doors.

With ALL these Quality Features

INTERIORS are flexible and adaptable to almost any service and voltage. Plug-in units and solid neutral can be changed simply and quickly.

BOXES provide generous wiring space.
FRONTS furnished with or without doors have adjustable trim clamps.

UNITS have quick-make, quick-break switch mechanism, visible blades and are horsepower rated. 30, 60, 100 and 200 ampere units are plug-in, while 400 and 600 ampere units are bolted to the bus.



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ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

OPERATION AND PRODUCTION pointers for the industrial plant engineer

Edited by H. E. B. Anderson

Coarse-Threaded Fasteners—Strong and Economical

FASTENERS with fine threads are not as strong as those with coarse threads, according to Russell, Burdsall & Ward fastener specialists.

Fine threads may not have the rigidity and sufficient flank engagement to carry the loads. In coarse threads, the deeper and more rugged thread will carry the load and have more uniform stress concentrations, thus will be better able to prevent stripping.

Contrary to the belief that fine threads stay tighter than coarse threads, fineness or coarseness of threads has nothing to do with a fastener staying tight. The only force that keeps a joint tight is the amount of residual tension set up by torquing, and in a fastener with coarse threads a larger percentage of the torque effort is transferred into residual tension.

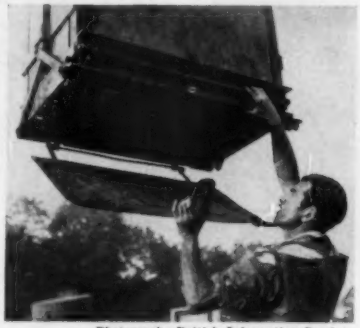
Production economies are evident in the fact that coarse thread fasteners tighten with only two-thirds the number of revolutions needed for fine threads. Coarse threads are less likely to be damaged in handling and enter nuts or mating holes with less tendency to cross thread when not truly positioned.

Except for applications where fine adjustment must be provided, standard coarse thread fasteners are best.

Carrier Handles Brick in Bulk

TO SPEED the handling of materials on construction sites, a British firm, Wates, Ltd., has designed a container which can carry 200 bricks at one time. The bricks are first arranged on a pallet, the container is placed over them, and scissor-type jaws pick up the pile, leaving the pallet.

When the load is raised to a convenient height, a safety plate is clamped into position under the load of bricks, to catch any bricks that may slip out of the load. For unloading, the plate is released, the load set down at the job site, and the container lifted clear, leaving the bricks in a neat stack, as they were originally positioned.



Photograph: British Information Services

Workman clamps safety plate into position on bottom of brick container

Tips Saved by a Taper

SAVING TIPS that would otherwise be scrapped, a tool which reduces the hole size in used oxygen-acetylene

(Continued on page 50)

Flush Cleaning Method Devised for Pressure Gage Bourdon Tubes

SUCCESSFULLY ADOPTED at the Portsmouth Naval Shipyard, a new method has been developed for cleaning pressure gage Bourdon tubes. Periodic cleaning of these tubes is recommended as a safety measure, particularly where oil or foreign matter may be present in the tubes of gages used in air, oxygen or other potentially hazardous gas services. In these cases, the danger of explosion is always present.

The Instrument Section of Portsmouth's Electrical Shop developed a simple and effective process of flush and reverse flush cleaning. As a preliminary step, a 0.036-in. hole is drilled ¼ in. from the sealed end of the tube.

The method, as schematically shown in Fig. 2, proceeds as follows: the worker adjusts valve 1 to obtain an air pressure of 16 psi; closes valves 3 and 5; opens valve 4; opens valve 2 to permit trichlorethylene to flow through the tube and out of the 0.036-in. drilled hole, where it is deflected by a baffle into the waste pan; closes valve 2 after one second; and opens valve 3. The vacuum head will draw the trichlorethylene left in the tube back through it into the waste tank. The entire sequence is repeated three times to insure a thorough cleaning of the tube.

After all tubes in a lot have been cleaned, valve 5 is opened to drain the contents of the waste pan into the waste tank. These wastes are then discarded.

After each tube is cleaned and dried, the hole which was drilled in the tube is sealed with a 0.035-in. brass plug soft-soldered in place then tested to 25 per cent over full scale, before reassembling the gage from which the tube was taken.

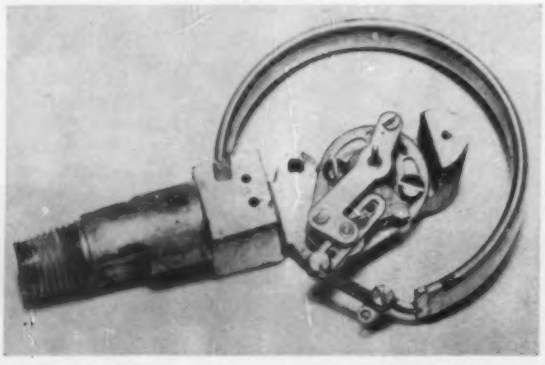
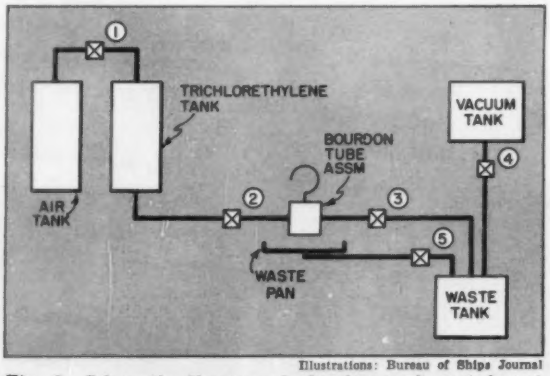
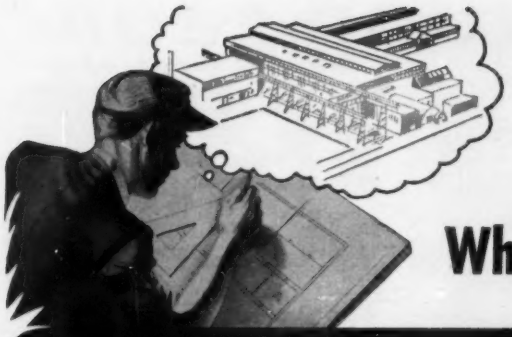


Fig. 1. Bourdon tube taken from gage, ready for cleaning

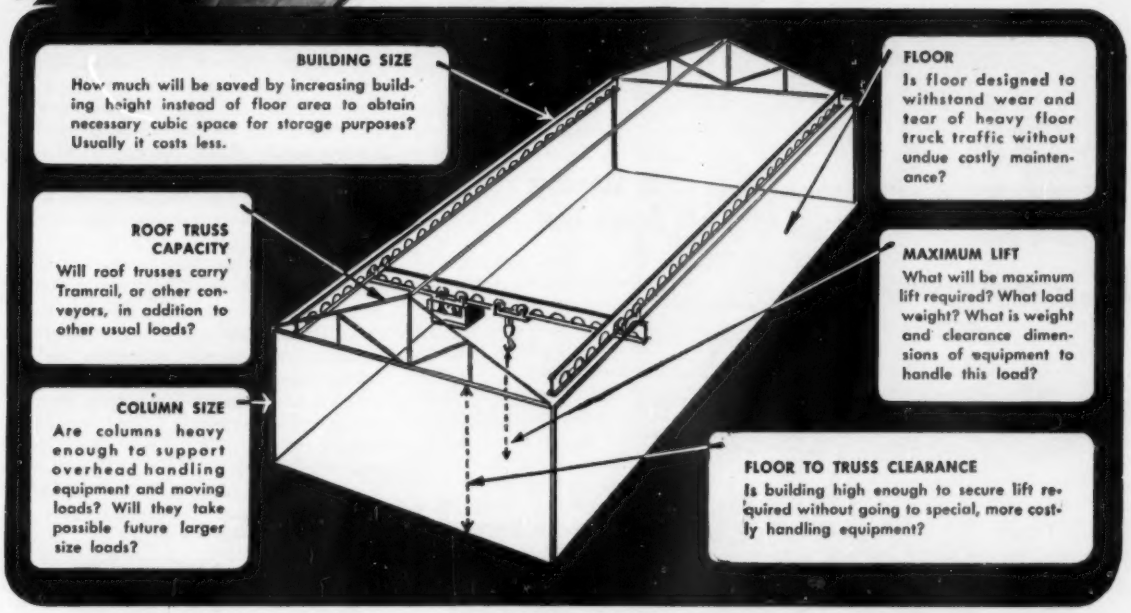


Illustrations: Bureau of Ships Journal

Fig. 2. Schematic diagram of cleaning equipment layout



Don't Forget *Materials Handling* When Designing the Building


BUILDING SIZE
How much will be saved by increasing building height instead of floor area to obtain necessary cubic space for storage purposes? Usually it costs less.
ROOF TRUSS CAPACITY
Will roof trusses carry Tramrail, or other conveyors, in addition to other usual loads?
COLUMN SIZE
Are columns heavy enough to support overhead handling equipment and moving loads? Will they take possible future larger size loads?
FLOOR
Is floor designed to withstand wear and tear of heavy floor truck traffic without undue costly maintenance?
MAXIMUM LIFT
What will be maximum lift required? What load weight? What is weight and clearance dimensions of equipment to handle this load?
FLOOR TO TRUSS CLEARANCE
Is building high enough to secure lift required without going to special, more costly handling equipment?

The foremost demand of a new factory building, whether for production or storage, is that its design and construction aid overall operating efficiency to the utmost. Thus, the building becomes more than just an enclosure, but is actually a vital part of the manufacturing process.

It is, therefore, imperative that the various steps entering into the making of an item be thoroughly considered when the building is designed. One of the most important of these concerns materials handing because this item often amounts from 25% to 50% of the total production cost, and, also, because it is plant-wise in nature.

Regardless of what handling methods are deemed best, overhead cranes or Tramrail, roller or chain conveyors, floor trucks, etc., the building design, size and construction usually has a tremendous bearing on the ultimate handling efficiency secured. Building clearances, floor construction, column locations, aisleway allowances and other factors must be considered for the different handling methods for most satisfactory results.

For initial economy in installation, for most satisfactory operation and highest efficiency, plan for materials handling when you design the building. ***Do not make materials handling an afterthought.***

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THE CLEVELAND CRANE & ENGINEERING CO.
7573 EAST 284th STREET WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

For more facts circle 538 on Reply Card

OPERATION—PRODUCTION

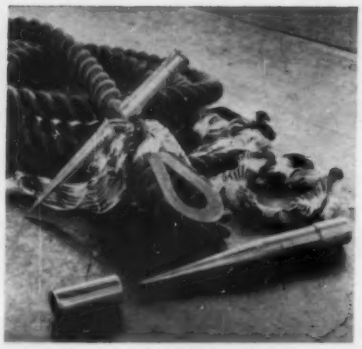
(O and P begins on page 48)

torch tips has been devised at the Puget Sound Naval Shipyard. Devised by William B. Herrick at that installation, the device is described in the Bureau of Ships Journal.

The tip seat is held in a socket with exactly the same taper as the seat itself. This socket is provided so that no damage will result when the tip is forced into another opposing socket. This opposing socket is a few degrees sharper than the cutting end of the tip, and when the tip is forced into it, the sharper taper compresses the flame and cutting holes so that they can be redrilled to their original size.

Streamlined Rope Splicing Tool

USED FOR CENTURIES to separate strands of rope for splicing, the fid now has a new look at Glenn L. Martin Co., Baltimore, where rope is used for mooring seaplanes. Fitted with a metal sleeve, the fid is driven through the lay of the strands to about half the length of the sleeve. The fid is removed, and the sleeve remains between the separated strands. The rope end to be



Fid and sleeve are shown run through lay of rope. Components in foreground

braided is easily passed through, and the sleeve is removed.

Quick-Acting Couplings Cut Roll Change Time

WHEN A SINGLE stand reducing mill in a steel finishing plant turns out steel sheet at a maximum speed of 800 feet per minute, down time for roll changes means a costly production loss. This problem is especially troublesome at Crucible Steel Company's Midland, Pa. plant, which rolls stainless steel to a mirror finish.

Work rolls have to be changed as soon as the roll surface shows even the slightest deterioration. In addition, the work rolls have to be changed when production changes from narrow to wide strip.

Generally, the work rolls at Crucible's 56-in. four high reducing mill had to be changed about twice in every 8-hour shift. To keep the downtime loss from these shutdowns reduced to a minimum, replacement rolls are kept in reserve alongside each mill. However, although mill crews become expert at removing one roll and replacing it with another in a remarkably short time, one difficulty often bogs down the operation—coupling and uncoupling of fluid lines connected to the rolls.

These lines provide lubricant to both cool and lubricate the bearings of the back-up rolls, and feed high pressure hydraulic fluid into lifting jacks that control the height of the upper rolls. Originally connected to the roll blocks by threaded fittings, the lines had to be disconnected and reconnected every time a roll was changed.

Furthermore, the lines to the lifting jacks carry oil at 850 psi, and the fittings required extreme tightening to make them leakproof. Crucible found that this step alone—connecting and disconnecting the threaded fittings—accounted for more down time than the 20 minutes required by a skilled crew for the rest of the roll changing operation.

To eliminate this time loss, Crucible uses quick-connect and disconnect

(Continued on page 52)

"Erector Set" Building Construction Adds Flexibility to Laboratory

THREE-DIMENSIONAL flexibility has been achieved in the new Metals and Ceramics Building at General Electric's Research Laboratories. Main contributors to this flexibility are three mezzanine structures incorporated in its design. One of them, a two-story structure, with both floors being adjustable in height, can be installed like a giant erector set, adjacent to any two building columns on the main operating floor.

Fig. 1. Closeup of tubular columns and I-beam structurals shows bolt holes

Fig. 2. Two-story operating structure as constructed with erector set

The floors of this portable mezzanine are each 24 ft by 25 ft in size, and may be adjusted in height in increments of four inches. All structural members are punched with holes four inches on centers, and may be framed together with bolts in a wide variety of combinations to provide floor apertures for process equipment, or support for concentrated loads.

Stairways may be located in the structure as desired, for access or emergency egress. Flooring is of heavy gage galvanized steel sheets, formed and welded with a smooth top surface over a heavily corrugated bottom surface for minimum weight with sufficient rigidity to carry loads on the six-foot spans between structurals.

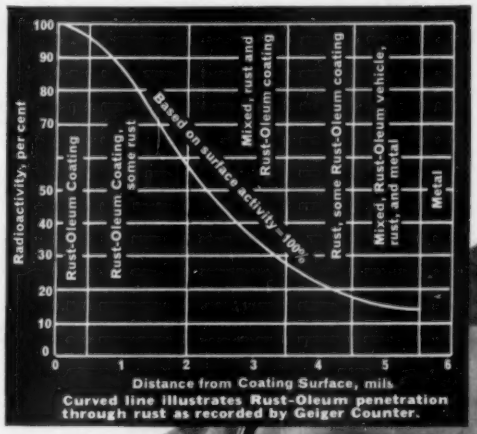
The hundreds of punched holes in each beam and column are convenient for attaching and supporting all types of small process equipment, plumbing, conduit and other similar services. In the high-bay area of the building, it is possible to erect a three-story mezzanine with floors at the 8-ft, 16-ft and 24-ft levels, while still maintaining a crane access clearance.

RUST-OLEUM®

PENETRATION

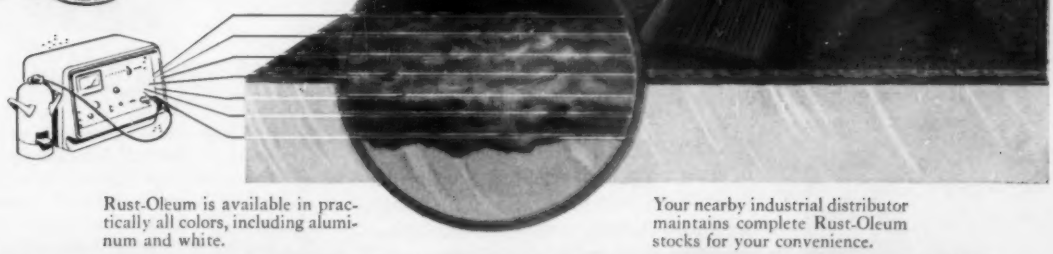
through rust to bare metal traced by Geiger Counter. To effectively stop rust—the vehicle of a protective coating, when applied over a sound, rusted surface—must penetrate through the rust down to bare metal. **Rust-Oleum does exactly that!—as proved by radioactive research!** Rust-Oleum's specially-processed fish oil vehicle was radio-activated and formulated into Rust-Oleum 769 Damp-Proof Red Primer—then applied to rusted test panels. Penetration *through rust* to bare metal by Rust-Oleum's specially-processed fish oil vehicle was then traced by Geiger Counter.

You stop rust, because Rust-Oleum's fish oil vehicle soaks deep down to bare metal and into the tiny pits where it drives out air and moisture that cause rust. You save, because this same *penetration* enables you to apply Rust-Oleum directly over rusted surfaces—usually eliminating costly surface preparations. Attach coupon to your letterhead for your thirty-page report entitled, "The Development of a Method To Determine The Degree of Penetration of a Rust-Oleum Fish-Oil-Based Coating Into Rust On Steel Specimens," prepared by Battelle Memorial Institute technologists.



Curved line illustrates Rust-Oleum penetration through rust as recorded by Geiger Counter.

There is only one Rust-Oleum. It is distinctive as your own fingerprint. Accept no substitute. Buy—and specify only Rust-Oleum. You'll be happy that you did.



Rust-Oleum is available in practically all colors, including aluminum and white.

Your nearby industrial distributor maintains complete Rust-Oleum stocks for your convenience.

RUST-OLEUM®

STOPS RUST!

See our Catalog in Sweets, or write for complete information.

For more facts circle 539 on Reply Card

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2722 Oakton Street
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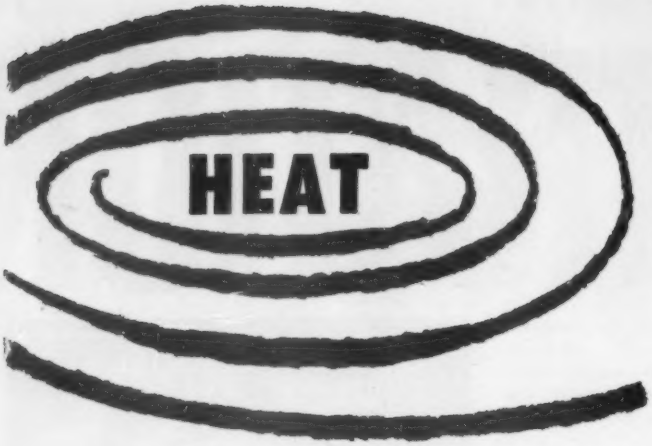
- ☐ Complete literature including color charts.
- ☐ Thirty-page report on Rust-Oleum penetration.
- ☐ Nearest source of supply.



. . . may be the "trouble" with your electrical system

Are you troubled with nuisance power interruptions, insufficient branch circuit capacity, motor burnouts and the accompanying costly production delays? You will probably find that *heat* affecting your protective electrical equipment is the heart of your trouble.

You can eliminate heat considerations, however, simply by replacing with HEINEMANN Circuit Breakers.

HEINEMANN Circuit Breakers do not employ thermal elements or heaters of any type. Thus, their current carrying capacity and all set tripping points are completely independent of ambient temperature . . . unaffected even by nearby furnaces, steam pipes or cold drafts. HEINEMANN Circuit Breakers do not require de-rating. With HEINEMANN, 20 amperes means 20 amperes of usable capacity without needless tripping.

HEINEMANN Circuit Breakers operate on a hydraulic-magnetic principle. They provide inverse time delay to allow starting inrush or harmless, temporary overloads . . . yet they provide the fastest circuit interruption available on large overloads or short circuits.

GET THE COMPLETE FACTS: Send for your copy of "WHAT YOU SHOULD KNOW ABOUT CIRCUIT BREAKERS". Ask for Manual 101.

HEINEMANN ELECTRIC COMPANY
128 Plum Street • Trenton 2, New Jersey

HEINEMANN Circuit breakers

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OPERATION—PRODUCTION

(O and P begins on page 48)

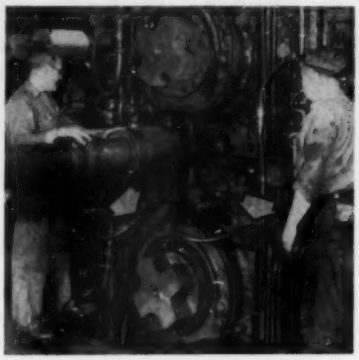


Fig. 1. Roll extractor is moved into position to remove top roll. Arrows show hydraulic lines that must be broken

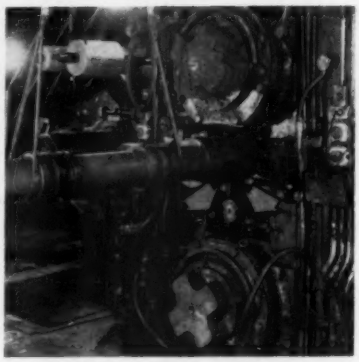


Fig. 2. Extractor coupled to roll, and hydraulic lines broken. Arrows indicate quick-connect couplings in roll block

couplings in the fluid lines. Quick-Seal couplings, manufactured by Titeflex, Inc., have been adopted at this mill.

To avoid the time lost in shutting valves in the fluid lines during changes, the couplings feature built-in check valves which snap closed automatically when the coupling is opened, thus closing off both ends of the line.

After five years of use, Crucible has found that roll change down time is reduced to the bare minimum required to removal and replacement of the rolls.

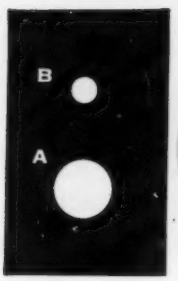
Stack Reconditioning

FIFTY GALLONS of white synthetic rubber-base paint, 10 gallons of enamel, 10 gallons of thinner and 10 days of labor were the elements recently combined to recondition and cover the 190-ft stack of a sugar producing plant in Napoleonville, La.

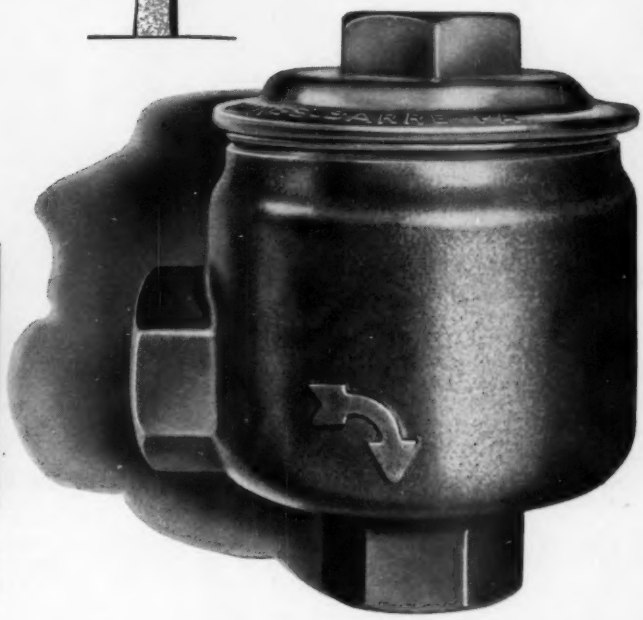
Only one coat of paint, based on

TALK ABOUT

Capacity



Discharge orifice of 1" NICHOLSON trap (A) compared with other types of same size (B). Nicholson's greater—in every size!



Compare capacity of a Nicholson Steam Trap with any other trap of same size. Greater capacity—right across the board—means Nicholson Industrial Traps discharge condensate and air from steam lines and process equipment *faster*, more *effectively*. In toughest plant service, Nicholson's pay off 4 ways:

- **lower initial cost—more for the money**
- **less upkeep expense—minor maintenance**
- **faster warmup—high, even temperatures**
- **faster production—increased 20% to 30%**

Where performance counts, specify Nicholson. Write for *Catalog 953*.

NICHOLSON

W. H. NICHOLSON and Company

TRAPS • VALVES • FLOATS • METAL PARTITIONS

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New help in selecting finest hand tools . . .

*Snap-on INDUSTRIAL TOOL CATALOG

Now . . . write for this complete, concise and easy-to-use ordering guide for the line of *Snap-on* sockets, wrenches and other tools for industry.

To users of power-driven nut runners and impact wrenches, this book offers an instant answer to every socket need. Every type, every size is tabulated with important dimensions and specifications listed clearly. Also included is the wide selection of *Snap-on* hand tools for assembly operations and for plant maintenance work. This edition obsoletes any previous issue in your files. Write for your copy of Catalog 54-I today.

*Snap-on is the trademark of Snap-on Tools Corporation.

SNAP-ON TOOLS CORPORATION
8068-A 28th Avenue, Kenosha, Wisconsin

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OPERATION—PRODUCTION

(O and P begins on page 48)

Pliolite S-5, a product of the Goodyear Tire & Rubber Co., was required to cover the 5,000 sq ft of stack surface. It was used to replace previous coatings that had weathered badly, resulting in several fractures and an extremely porous surface on the stack. Moisture infiltration had rusted out some of the underlying reinforcing steel and necessitated reconditioning the chimney.

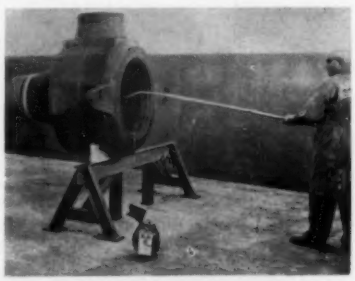
Using an external bracket type scaffold and starting from the base of the stack, workmen "hammer-tested" the entire surface for loose fragments in the outer shell. This loosened shell was cut away and underlying concrete was deeply scored and coated with a bonding fluid. Mortar mix, waterproof and acid resistant, was trowelled in to conform to the contour of the stack.

In pitted areas one inch in depth or over six inches in diameter, new mortar had to be supported by means of expansion shields and lugs anchored in to provide new reinforcing steel. As the workmen moved up the stack, the entire surface was wire brushed to prepare it for adherence of the paint.

Reaching the top of the stack, workmen dropped down in a swinging scaffold with a bos'n chair and painted the stack.

Gamma Ray Inspection Procedure

COBALT-60 is being used successfully and economically to test welds in piping, valves, and large and complicated alloy steel castings in which



With gamma ray source at end of 7-ft rod, operator prepares to check weld

walls as thick as 2½ in. are built-up by welding at the Toledo, Ohio, plant of The National Supply Company.

Use of cobalt-60, obtained indirectly from the Atomic Energy Commission at Oak Ridge, Tenn., gives the company a source of gamma rays

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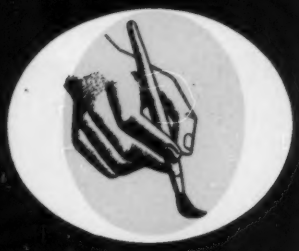
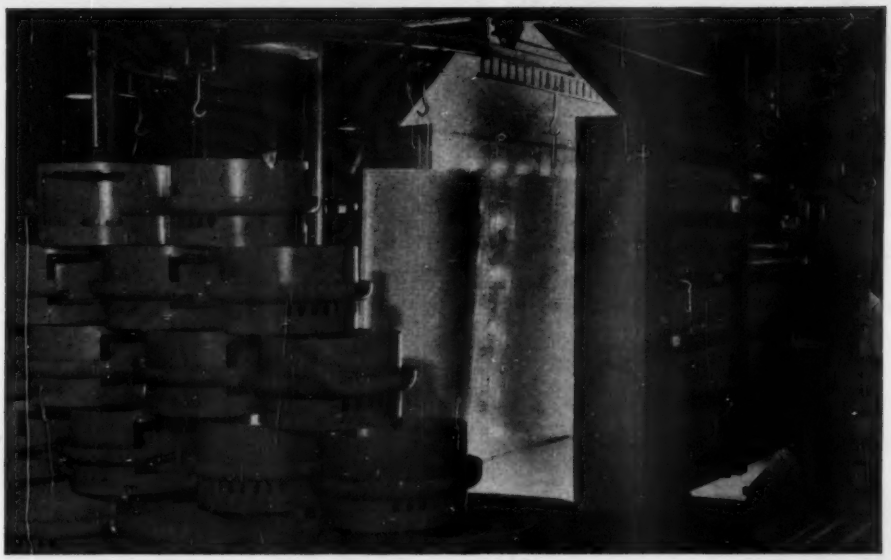


dag DISPERSIONS®



Better dry-film lubrication for high-temperature conveyors

High temperatures are playing an increasingly important part in production operations today. And increased temperatures bring increased difficulties with lubrication. But 'dag' Colloidal Graphite will solve your high-temperature problems . . .

Where conventional lubricants gum up and carbonize, or cause contamination by dripping, *dry lubricating films* formed from 'dag' dispersions assure trouble-free service. Dilutions in mineral spirits, kerosine, alcohol, or other organic solvents provide durable, tenacious coatings which can be applied by hand or by automatic oilers.

Conveyor chains use 'dag' Colloidal Graphite extensively where conventional lubricants prove inadequate because of heat, solvent spray or vapors, or other severe operating conditions. One prominent manufacturer uses an oil dispersion ('Oildag'®), diluted in a light, low-carbon oil, on the bearings of oven-conveyor trolleys. No other lubricant has ever been satisfactory for the purpose, but 'dag' Colloidal Graphite in oil withstood the 600°F. heat of the tempering ovens . . . and the 300°F. temperatures and solvent vapors in paint ovens as well.

For information write for Bulletin No. 423-Z6.

Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of carriers.

ACHESON COLLOIDS COMPANY

PORT HURON, MICHIGAN

...also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND

use 'dag' dry films for trouble-free lubrication

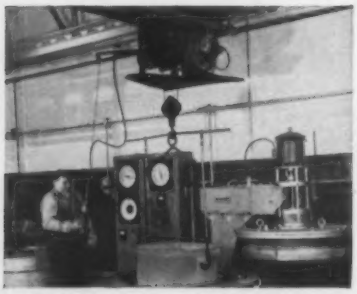
"SAFELY DOES IT" AT DESOTO PLANT

In the automotive industry, as in manufacturing plants across the nation, the emphasis is always on safety. In the mammoth DeSoto Plant, a car body, above, moves smoothly and efficiently along the assembly line secured *safely* to the body-drop hoist with 28 Crosby Clips. Everywhere, workmen recognize and know they can depend on the clip with the Red-U-Bolt—genuine *safe* Crosby Clips. Today, Crosby Clips safeguard more men and equipment than any other drop-forged wire rope fasteners.

Blocks. Workmen know that the Crosby Block they're using is right for the job, and that valuable equipment is protected because the safe working capacity is *embossed right on the side-plates*. Load-Rated Crosby Blocks and genuine Crosby Clips are products of the Crosby Division, American Hoist & Derrick Co., St. Paul 1, Minnesota.

EXCLUSIVE TURNBUCKLE EYE INCREASES USEFULNESS

A pear-shaped turnbuckle eye designed to take the ear of a shackle one size smaller, as well as the standard shackle, is another exclusive product developed for efficiency in industry by the Thomas Laughlin Division of American Hoist & Derrick Co. Industrial users report that Laughlin's exclusive double-duty eye not only rates the approval of workmen, but also helps cut their turnbuckle inventory.



CUTS HOIST ACCIDENTS

To help eliminate the major cause of hoist accidents—loads slipping or jarring off the hook—safety-conscious industrial users in plant after plant are switching to Laughlin Safety Hooks. A powerful snap-spring latch on drop-forged Laughlin Safety Hooks guarantees that loads cannot be jarred from the hook and prevents overloading with too many lines. Laughlin Safety Hooks are part of the famous Laughlin line—the world's most complete line of fittings for wire rope and chain. For complete catalog, write: Thomas Laughlin Division, American Hoist & Derrick Co., St. Paul 1, Minnesota, or Portland, Maine.

MEN, EQUIPMENT PROTECTED

A positive means of avoiding accidents due to overloaded blocks is provided industry by Load-Rated Crosby

For more facts circle 544 on Reply Card

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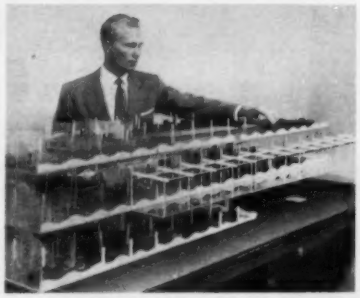
equivalent to that of radium costing more than 30 times more.

National Supply Company obtained a piece of cobalt-60 that is about ⅛ in. square, and a lead container with 4-in. walls for transportation and storage. It is kept and used in a room with 18-in.-thick concrete walls.

To prepare for gamma-ray inspection, x-ray film is wrapped around the outside of a weld and metal numbers taped at several points for identification of film position and location of defects, if any. Penetrometers consisting of small pieces of steel about 2 per cent of the metal thickness and with two or three holes through them are also taped on the metal near the welds as a means for comparing possible dark spots that indicate defects. The film is covered with opaque paper as protection against visible light rays. The cobalt-60 is then put in position to emit its gamma rays through the weld. It is left in this position for periods ranging from 20 minutes to 8 hours, depending upon the conditions of test.

Plastic Model for Plant Layout

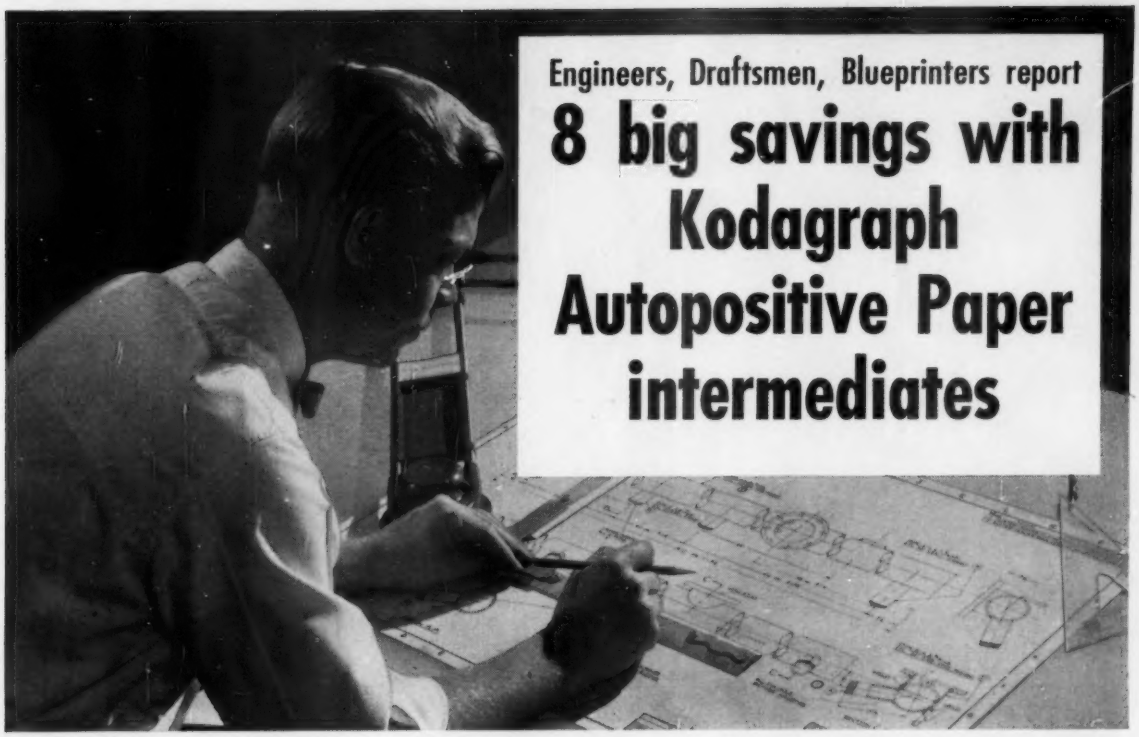


Plastic model of main plant of Vard, Inc., Pasadena, Calif., is utilized by company engineers for plant layout and production control techniques. Currently laid out with three floors of machine tools, three dimensional flexibility permits accurate planning for plant changes

Recessed Loading Platform

SET TWO FEET inside the building it serves, a recessed loading platform has proven of great value in economical handling of truck shipments at the Barry Controls, Inc. plant, Watertown, Massachusetts.

The installation of the loading platforms was designed by Barry's Works Manager Harold Wrigley for a new warehouse. The "indenting" of the two 12-ft by 12-ft truck bays has



Engineers, Draftsmen, Blueprinters report

8 big savings with Kodagraph Autopositive Paper intermediates

Revolutionary Kodagraph Autopositive Paper, which produces positive photographic intermediates *without a negative step or dark room handling,* brings these savings to drafting rooms large and small.

1. Protects original drawings. Low-cost Autopositive Paper intermediates are used instead of valuable originals in printmaking, reference, mailing, and making revisions.

2. Reclaims drawings which are old, worn, or soiled. Reproducing them on Autopositive Paper cleans up backgrounds, strengthens line detail . . . eliminates redrafting.

3. Improves legibility of prints. Blueprints or direct-process prints made from Autopositive Paper intermediates are consistently easier to read than prints made from original drawings.

4. Reproduces "unprintable" originals. When extra copies are needed of blueprints, drawings on opaque stock, two-sided originals, and other "unprintables," just reproduce them on Autopositive Paper *and you have your printmaking masters.*

5. Speeds revisions of drawings. A popular short cut is to cut out or eradicate detail on an Autopositive Paper intermediate . . . and then add the new detail to this print or one made from it.

6. Eliminates redrafting standard component designs. From a file of standard component designs made on Kodagraph Autopositive Film, select the ones needed and attach to drawing form with translucent tape. Then reproduce on Autopositive Paper, add new detail and the job is done.

7. Simplifies print distribution. Instead of shipping bundles of production prints, send Autopositive Paper intermediates. Mailing costs are saved. Required number of prints can be made at other end. No overstocking this way . . . or running short of prints.

8. Provides photo-lasting copies. Autopositive Paper intermediates, with dense black photographic lines on a translucent white paper base, will not turn yellow or become brittle in the files; will produce sharp, legible prints whenever needed.

New illustrated booklet gives full story on Kodagraph Autopositive Paper, which you, or your local blueprinter, can process readily with existing printmaking equipment and standard photographic processing.

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Gentlemen: Please send me a free copy of your new booklet on Kodagraph Reproduction Materials.

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C&D Batteries for EXTRA work

The American Can Company has played a major part in virtually every important development in the can and container industry. American Can developed equipment is responsible for high-speed production which produces millions of cans in a single day. To help solve their material handling problems, the American Can Company uses C & D Slyver-Clad* batteries as one of their sources of power for the industrial trucks used in daily operations.

C & D Slyver-Clad batteries are approved as standard equipment by all electrical truck manufacturers. For further information, write for Catalogs.

*T. M. Reg.

C&D BATTERIES, INC.
of Conshohocken, Pa. | Attica, Indiana

Industrial Batteries since 1906

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

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OPERATION — PRODUCTION

(O and P begins on page 48)

eliminated the need for an outside waterproof enclosure to protect outgoing and incoming shipments.

A leveling platform, installed immediately behind the loading dock edge permits easy lowering of shipments from truck bed level to the floor level of the warehouse. In addition to the weather protection aspect of the in-

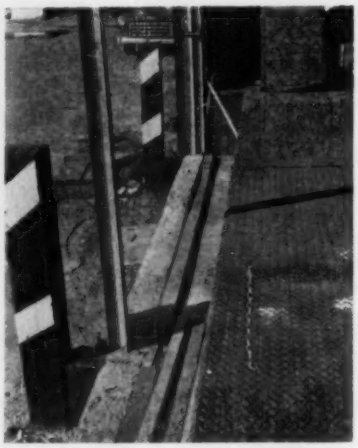
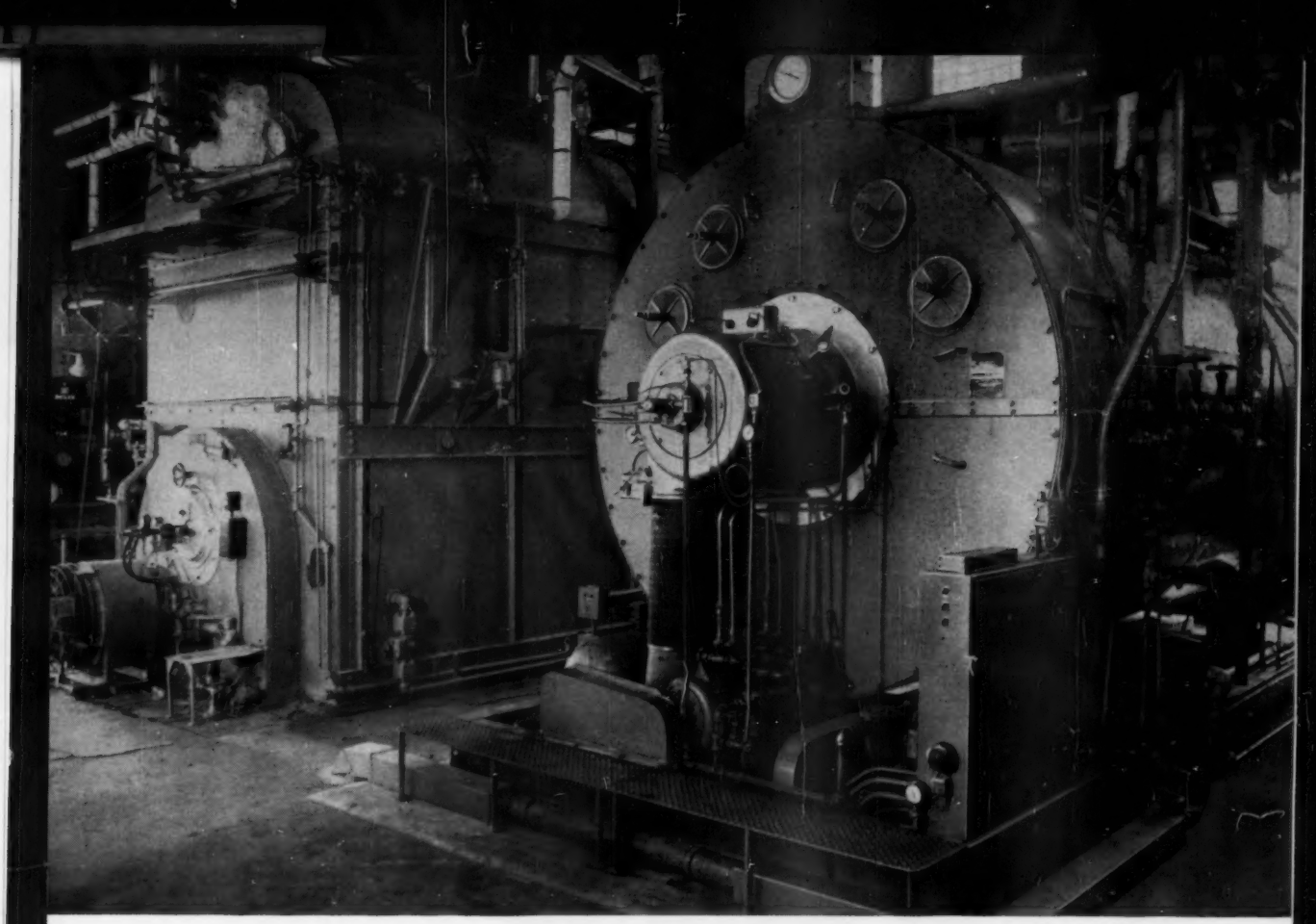


Fig. 1. Leading edge of inside loading dock is set two feet from outer wall

Fig. 2. Leveling platform behind loading dock moves shipments to floor level

door installation, other advantages of this design include the elimination of a rugged and expensive outside loading platform that must be strong enough to withstand the buffing of trucks and consequent damage to building walls, and the concentration of heat in the winter, since the back of the truck occupies most of the opening in the building wall.



Why was this *Powermaster*® switched from "Stand-by" to Full-Time Duty?

You get MORE than fuel economy with Powermaster

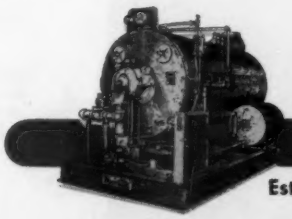
- ★ Low-cost, space-saving installation
- ★ Fast steaming
- ★ Instant response to load changes
- ★ Quick fuel change-overs
- ★ Clean, dry steam
- ★ Automatic operating and safety controls
- ★ Clean, quiet operation
- ★ Smokeless combustion
- ★ One-source responsibility for complete unit
- ★ Nation-wide factory-trained service organization
- ★ Pay-As-You-SAVE Purchase Plan

Originally purchased as a stand-by unit to supplement two older water-tube boilers, this 500 HP heavy oil *Powermaster* Packaged Automatic Boiler was quickly put on full-time duty by an Eastern rubber goods company.

The reason is *Powermaster's* fuel economy. While the *Powermaster* now carries the plant load continuously, the older boilers, one of which is shown at left above, are operated only when necessary.

Powermaster's cost-cutting and worry-saving advantages can be yours quickly and easily under Orr & Sembower's new Pay-As-You-SAVE Purchase Plan.

Write for Bulletin 1220.



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In sizes to 500 HP; pressures to 250 psi.

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Established 1885 • Morgantown Road, Reading, Pa.

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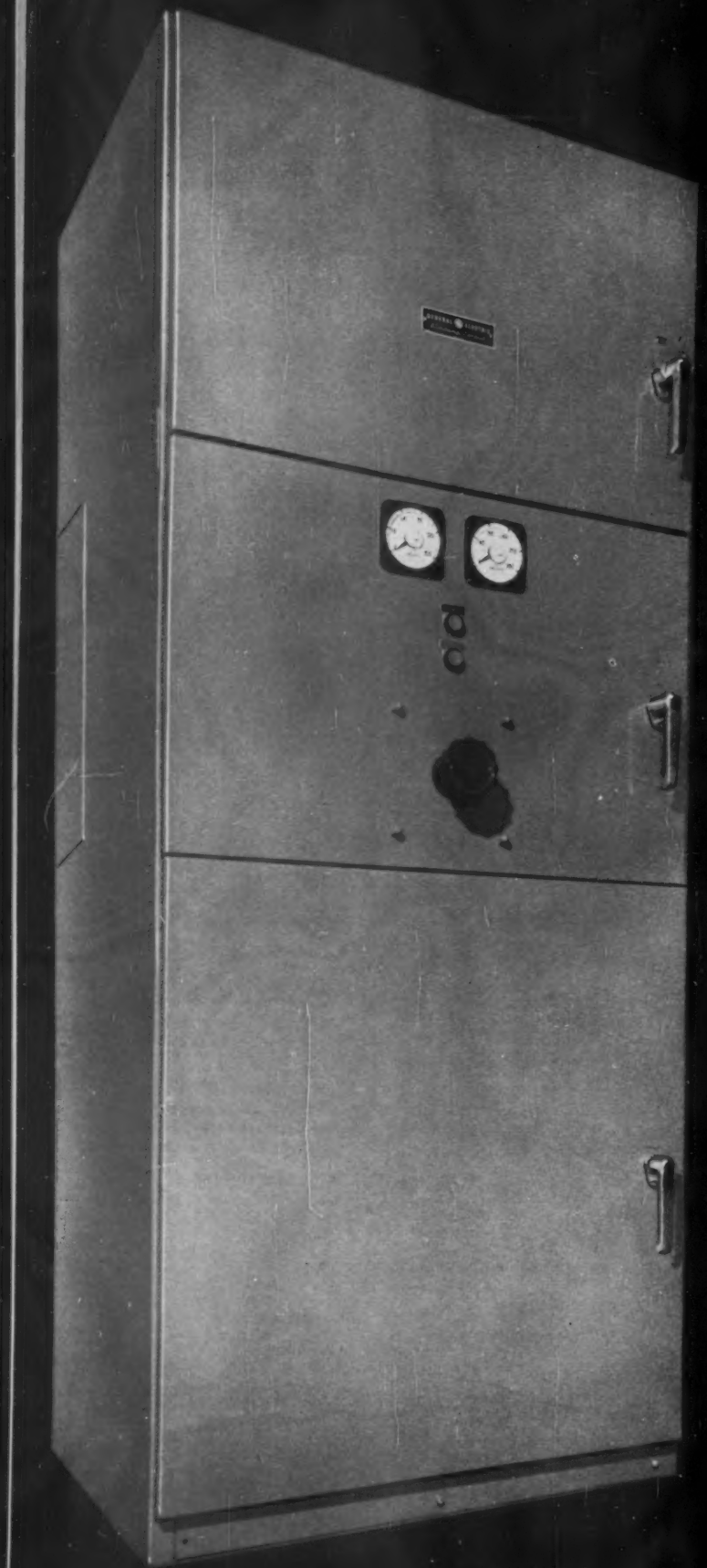
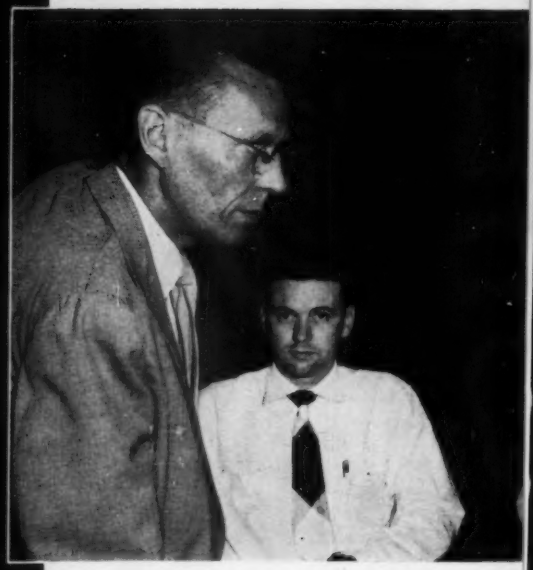




3 CUSTOMERS STATE . . .

Space, Safety

Placed on the market in July of this year, General Electric's all-new Limitamp Control has received enthusiastic acceptance throughout industry.

1. NEW MOUNTING ARRANGEMENTS. Almost immediately, L. L. Hamig, of Ferris & Hamig, Consulting Engineers, found the exclusive front-connected feature of the new control solved a tough application problem. There is no need for a back aisle with the new equipment, so units may be mounted back-to-back, back-to-wall, or as free standing enclosures yielding great space savings.

2. 50% SMALLER. In another case, H. A. Weigand, of Ingersoll Rand Company specified this new fused starter in a compressor station for the Laclede Gas Company of St. Louis, Missouri. Mr. Weigand stated the new control's 50% floor space saving feature simpli-

50% smaller than previous models, all-new G-E Limitamp Control offers a gang-operated disconnect switch as standard equipment. See opposite page for space savings comparisons.

"The all front-connected feature of G.E.'s Limitamp Control gave me the versatile floor arrangement I needed to solve a tough application problem," said Mr. L. L. Hamig (extreme left) of Ferris & Hamig, Consulting Engineers, St. Louis, Mo. Seated are R. E. Watts of Ferris & Hamig and P. L. Korklan, General Electric Co. Sales Engineer.

"The space savings offered by G.E.'s Limitamp Control helped simplify the installation of a compressor station for the Laclede Gas Co. of St. Louis," according to H. A. Weigand of Ingersoll Rand Company. The compressor station is located in a residential area and conforms to local building codes. This put space requirements at a premium and posed a real installation problem.

Problems Solved by New G-E Limitamp* Control

fied installation where space considerations were a primary factor. **3. ADDED SAFETY.** One of the nation's largest automobile manufacturers ordered eight of the starters and within days increased the order to 17. The gang-operated disconnect switch and co-ordination features which afford greater protection of the starter, the controlled equipment, and personnel were exactly what they wanted.

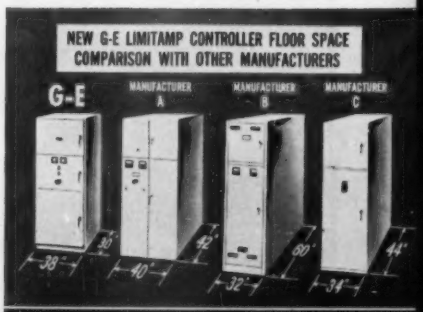
The 30" depth of the new Limitamp Control, which allows the unit to be transported through normal size doorways, has also received industry-wide approval. The unit's 90" height includes bus compartment which is surrounded by steel barriers within the enclosure.

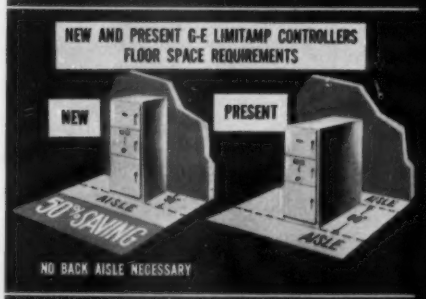
Other features which save time and money on installation and maintenance are the low-voltage panel, hinged to swing out of the cabinet, and the contactor which may be easily rolled in or out of the enclosure. This provides ample room for a worker to enter the enclosure while making installation connections.

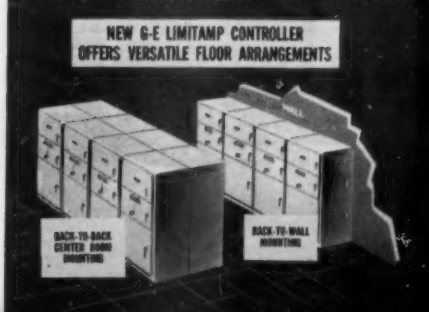
This all-new Limitamp Control is ideal for high-voltage motors, rated 2300-4800 volts, up to 3000 hp, and may be applied to squirrel-cage, synchronous, wound-rotor, and multi-speed motors on power systems requiring high interrupting capacity for maximum short-circuit protection.

Specify the all-new Limitamp Control through your nearest G-E Apparatus Sales Office. G-E engineers will help apply this new control to your operation. For more information write for Bulletins GEA-6331, GED-2446, to Section 781-14, General Electric Company, Schenectady 5, New York.

*Trade-mark of General Electric Co.






NEW G-E LIMITAMP CONTROLLER OFFERS VERSATILE FLOOR ARRANGEMENTS
BACK-TO-BACK CENTER DOOR MOUNTING
BACK-TO-WALL MOUNTING

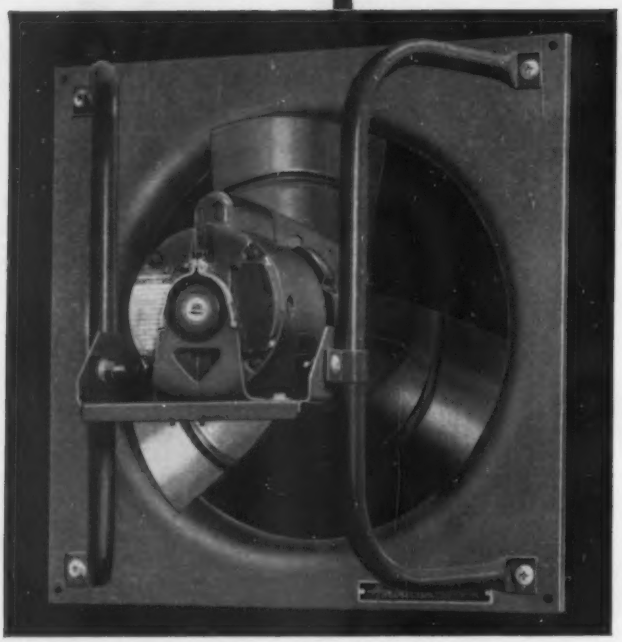
Progress Is Our Most Important Product

GENERAL ELECTRIC

For more facts circle 548 on Reply Card

American Blower
Ventura Fans
offer you

top performance and economical ventilation



American Blower Model K Ventura Fan

You can count on American Blower Ventura Fans to do the job they are designed for, with high efficiency and a minimum of maintenance. They are built for long life and top performance. All ratings are certified.

American Blower Model K Ventura Fans are ruggedly constructed, heavy-duty propeller fans for tough industrial applications. They offer the power you need . . . when you need it, and will operate against static pressures up to 5/8". Request Bulletin 6514.

American Blower Ventura Fans are attractively designed, quality built, and easy to install . . . *yet competitively priced.* Ventura Fans come in a wide range of sizes and capacities — with constant-speed and two-speed direct drives, totally enclosed motors — to satisfy your exact requirements.

CERTIFIED RATINGS

Certified ratings are the result of tests made by the Manufacturer in accordance with the Standard Test Code for Centrifugal, Axial and Propeller Fans adopted jointly by the National Association of Fan Manufacturers, Inc. and the American Society of Heating and Ventilating Engineers.

AUTHORIZED BY N A F M

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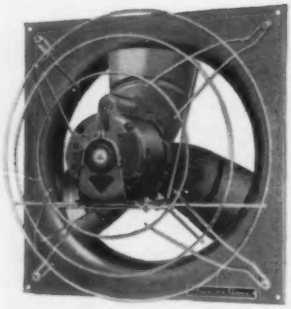
Certified Ratings

MEMBER OF PFMA



Model G Ventura Fans

Model G, at left, is a sturdily built and attractive fan suitable for light industrial duty and commercial applications. It is especially quiet-operating, making it ideal for offices, stores, and lobbies — or wherever quiet operation is required. Write for your copy of Bulletin 6414, which gives complete performance data.

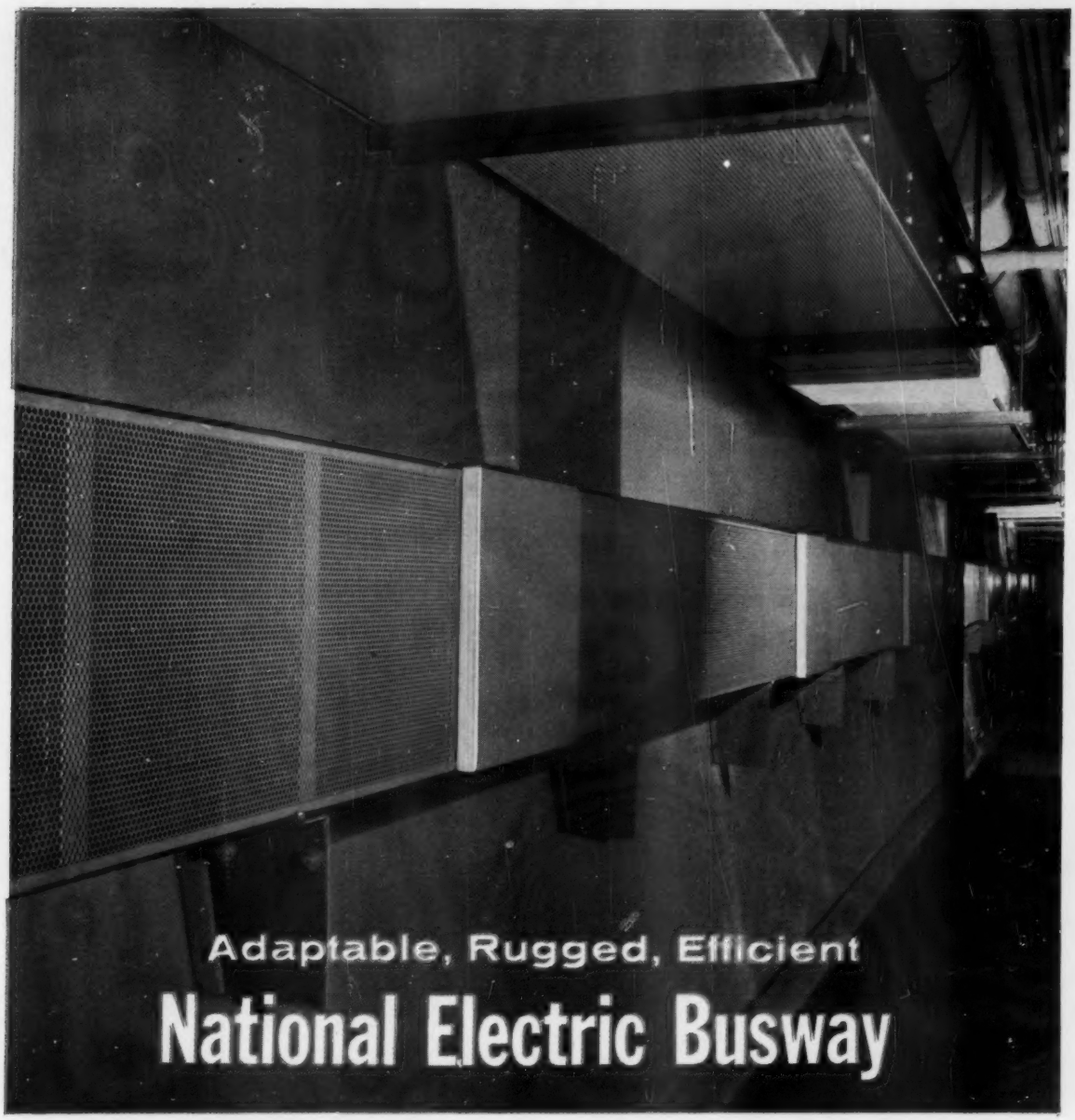
American Blower products serve industry

Air Conditioning, Heating, Ventilating Equipment
Mechanical Draft Equipment
Industrial Fans and Blowers
Centrifugal Compressors
Gyrol Fluid Drives
Dust Collectors

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of American-Standard

AMERICAN 75th ANNIVERSARY YEAR BLOWER

For more facts circle 549 on Reply Card



National Electric Busways are produced to meet the rugged requirements of American industry. Streamlined, compact, easy-to-install, they're designed to provide plenty of power to meet the changing needs of today's production schedules with reserve capacity for future expansion.

NE "LO-LOSS" FEEDER BUSWAY

EFFICIENT

- Designed for current transmission up to 4,000 amperes at 600 volts or less.
- With "Lo-loss" Busway voltage drop is less than 2.2 volts per 100 feet for a concentrated load. Where load is distributed, the drop is approximately 1 volt per 100 feet.

ADAPTABLE

- "Lo-Loss" is approved by Underwriters' Laboratories for horizontal or vertical mounting. Branch circuit and "Plug-In" Busway takeoffs can be made at any point.
- Simple, accessible bolted connections permit fast, easy installation and relocation. Single bolt connectors are used to join sections.

RUGGED

- Insulators are supported in sturdy 12-gauge steel channel frame . . . can stand rough handling during shipment and installation.
- On vertical installations, exclusive self-contained insulator support frame carries entire weight of bus bars independent of housing.

For remodeling or new construction of commercial or industrial buildings, you'll find NE Busway is the most economical, convenient, flexible and salvable system available. Send for complete information today.

Listed by Underwriters' Laboratories, Inc.

National Electric Products

PITTSBURGH, PA.

3 Plants • 10 Warehouses • 36 Sales Offices

For more facts circle 550 on Reply Card

LIGHTWEIGHT Modine Gas-Fired Unit Heaters save you money right from the start

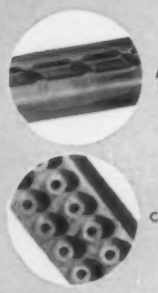
LOWER SHIPPING . . . INSTALLATION COSTS

WEIGHT COMPARISON

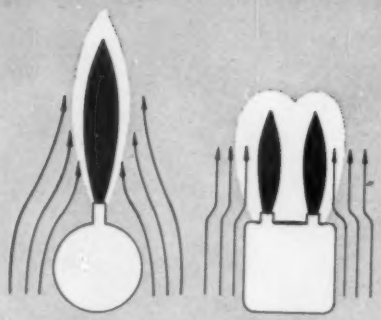
Brand	Capacity (Btu/hr. input)	Approx. Net Weight
Modine (aluminized steel)	105,000	105
Modine (stainless steel)	105,000	95
Brand "A"	100,000	170
Brand "B"	102,000	196
Brand "C"	90,000	175
Brand "D"	100,000	165
Brand "E"	100,000	210
Brand "F"	100,000	210
Brand "G"	105,000	170

Light weight, without sacrifice of strength or efficiency, makes Modine Unit Heaters easier to handle, faster to install. Also cuts need for expensive support structures.

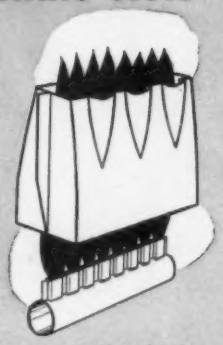
AND THESE DESIGN ADVANTAGES REDUCE OPERATING COSTS



No port clogging, cleaner burning
Self-cleaning Modine burner ports have four times free area of conventional drilled ports. Knife-sharp edges prevent lodging of scale, promote trouble-free operation.

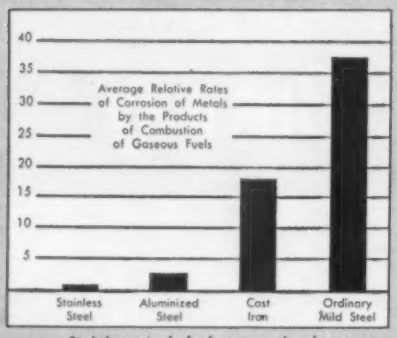


More usable heat per fuel dollar
Single-row burner ports help insure adequate secondary air supply. As a result, you get maximum combustion efficiency, more delivered heat per fuel dollar.

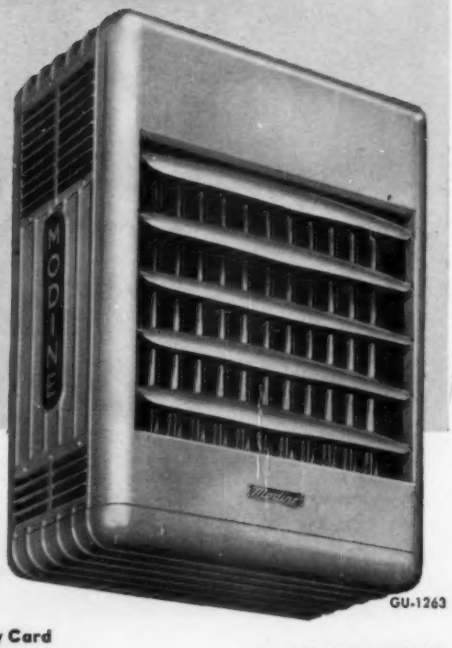


Faster, more uniform heating
Continuous flame from front to rear of individually fired exchangers, increases radiant heat absorption, uniformly distributes heat through tube.

LONGER LIFE . . . AND . . . LOW-COST SERVICE



Stainless steel slashes corrosion loss
Modine burners, to all practical purposes, are unaffected by acid corrosion, rusting and scaling (see chart) . . . give you many years of trouble-free, top efficiency.



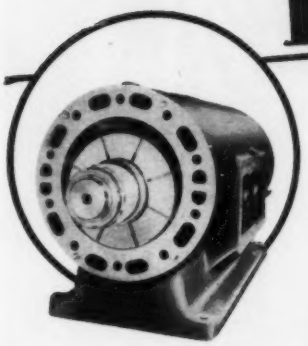
Modine UNIT HEATERS

NEW 12-PAGE BULLETIN 655 *gives you more complete information, selection and application data. Call the Modine representative listed in your classified phone book. Or write — Modine Mfg. Co., 1563 DeKoven Ave., Racine, Wisconsin.*

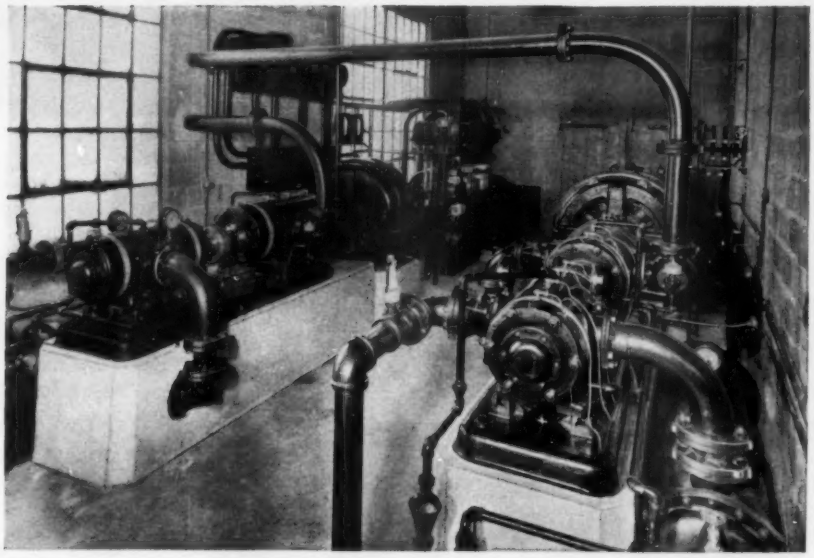
GU-1263

For more facts circle 551 on Reply Card

Fuller pioneered



the two-stage rotary compressor . . . for general industrial use . . . starting in 1930



INSTALLED 1930
STILL GOING STRONG ➡

Two Fuller Rotary Two-stage Compressors. Capacity each 740 c.f.m., 100-lb. pressure.

Fuller Company not only pioneered the rotary compressor for industrial use in this country, but it has always stressed the "spotting" of compressors. There's nothing new or startling about this principle . . . Fuller has advocated it ever since its first machines were put on the market in 1930 . . . applying each compressor to a specific job, with resultant overall plant economy, as well as power savings. Result: the adoption of this economical layout by thousands of users has proved to their satisfaction the soundness of such a program.

Fuller has built and sold thousands of Fuller Rotaries—a large proportion of the two-stage type. And, when plant expansion is necessary, with a consequent demand for more air, additional Fullers are naturally installed.

Fuller engineers have never rested on their oars, but have continually worked to improve design and efficiency, until today, these machines are second to none for dependable air-production in industry.

We welcome the opportunity to present to you all the facts concerning Fuller Rotary Compressors, facts built on actual operational experience. For a complete description of Fuller Rotaries, write for Bulletin C-5A.

FULLER COMPANY GENERAL AMERICAN TRADE MARK

FULLER COMPANY, 138 Bridge St., Catasauqua, Penna.

GENERAL AMERICAN TRANSPORTATION CORPORATION SUBSIDIARY

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C-275
1783

Fuller

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

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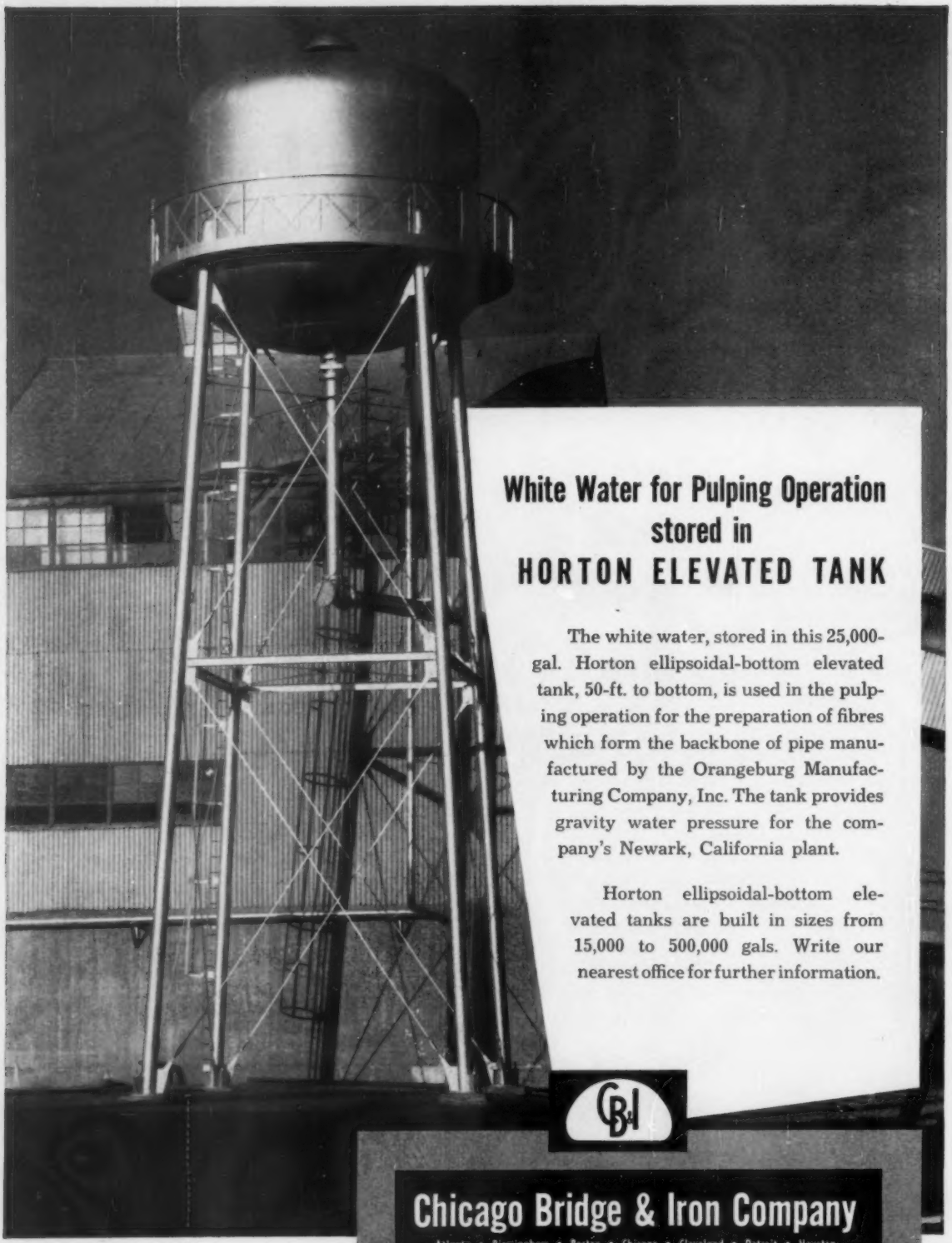

White Water for Pulping Operation stored in HORTON ELEVATED TANK

The white water, stored in this 25,000-gal. Horton ellipsoidal-bottom elevated tank, 50-ft. to bottom, is used in the pulping operation for the preparation of fibres which form the backbone of pipe manufactured by the Orangeburg Manufacturing Company, Inc. The tank provides gravity water pressure for the company's Newark, California plant.

Horton ellipsoidal-bottom elevated tanks are built in sizes from 15,000 to 500,000 gals. Write our nearest office for further information.

CBI

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Solve Lubricant Application Problems . . .
Slash Operating Costs . . .
Boost Production with
Lincoln LUBRICATION SYSTEMS

Whatever your lubricant application problem may be . . . automated production lines . . . a low cost automatic system for original equipment, or positive, reliable maintenance of existing facilities, Lincoln has the most modern device or complete system to meet your particular requirement.

When you specify Lincoln, you select from the most complete line on the market, backed by 35 years of engineering experience devoted exclusively to lubrication equipment, plus the prime advantage of Sales and Service facilities available through a coast-to-coast network of leading Industrial Distributors.

CENTRALIZED LUBRICATION SYSTEMS
(For One or Banks of Machines)
Complete selection of 26 Systems to meet every application. New Multi-Luber* System illustrated (manual or air operated).

POWER-OPERATED DRUM PUMPS
(For Original 100 lb. or 400 lb. Drums)
Complete selection of Air-Motors and Pump Tubes.

GREASE GUNS (Heavy Duty Steel Construction)
Lube Capacities from 16 oz. to 32 oz.

GREASE FITTINGS
(All Types and Thread Sizes)
From Hydraulic Ball-In-Head to Self-Tapping.

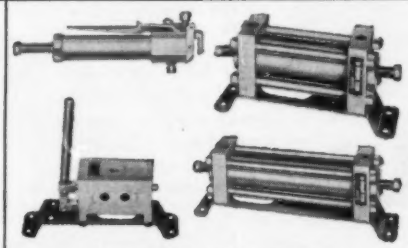
PORTABLE POWER LUBRIGUNS
(Electric or Air Operated)
Lube Capacities from 30 lbs. to 60 lbs

BUCKET PUMPS
(Portable-Steel Construction)
High and Low Pressure Models.

POWER-OPERATED TRANSFER PUMPS
(For Transferring Lubricants and Fluids From Original Drums)
Empties 55 gal. drum of S.A.E. 30 oil in two minutes.

HOSE REELS
(For Grease, Oil, Air and Water Services)
Heavy Duty, spring actuated.

MATERIALS DISPENSING SYSTEMS
(Power Operated for Pails, Spray or Flo Gun Applications)
Complete Systems for Original 400 lb. Drums, or 5 gal. Packages.



MEASURING VALVE SYSTEMS
(Foot or Hand Actuated—Any Capacity)
For Injecting Metered Quantities of Lubricant on Assembly Lines.

See all that's new in lubrication equipment at

Lincoln Engineering's Booth No. 1426, National Plant Maintenance Show
Philadelphia Convention Hall
Jan. 23 to 26, 1956

Here's how to simplify specification and purchasing . . . write for Lincoln's new Engineering Catalogs: No. 91 Fittings and Devices for O.E.M.; No. 80-1 Centralized Lubrication Systems; No. 64 Equipment For Productive Maintenance of Industrial Machinery; No. 41 Power-Operated Materials Dispensing Systems; and No. 31 Complete Portable Lubrication Departments For Contractors.

*Trade Name Registered Patent Pending

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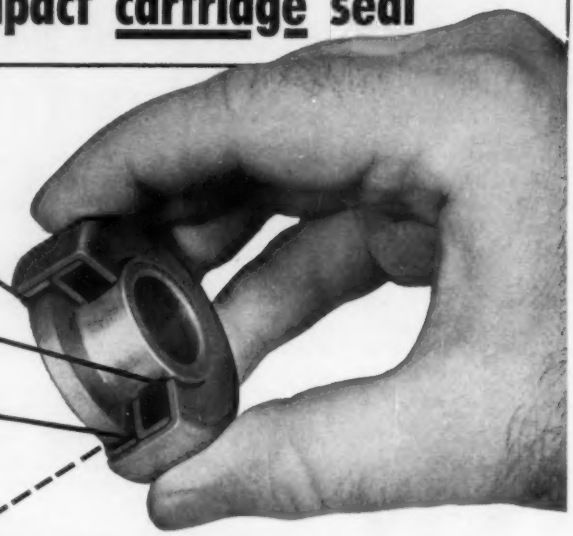
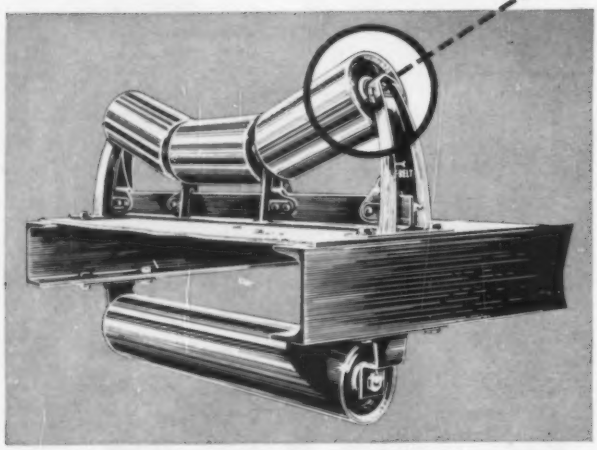
For longer idler life . . . here's 3-WAY protection in ONE simple, compact cartridge seal





THE effectiveness of Link-Belt cartridge grease seals in protecting belt conveyor idler bearings is matched by no other in industry. Besides the normal high efficiency of Link-Belt's labyrinth and contact seals . . . grease within the labyrinth further prevents entry of dirt or other particles. This cartridge (see above cutaway) is one integral unit—no springs, no loose washers . . . no possibility of metal-to-metal contact. From shaft to shell—bearings, fittings, rolls, frames, even hex nuts are designed for long, trouble-free life.

Also important, you can always find the *right* idler in industry's most comprehensive line—over 500 idlers in 34 types, built in a broad range of roll diameters and belt widths with matching return idlers. Ask your Link-Belt sales representative or authorized stock-carrying distributor for 48-page Book 2416, which covers this broad line thoroughly.

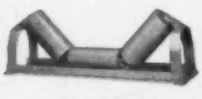
LINK-BELT

BELT CONVEYOR IDLERS

LINK-BELT'S superior grease seal is standard throughout industry's most comprehensive idler line

Series 100 Idlers
Continuous service for all but heaviest and coarsest materials.

Series 200 Idlers
Continuous service for heaviest and coarsest materials.



Series 400 Idlers
Continuous service for maximum volume per lineal foot of belt.

Series 500 Idlers
For greater volume than series 100 at maximum economy.

Series 600 Idlers
For grain and similar materials requiring only light belts.

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,808

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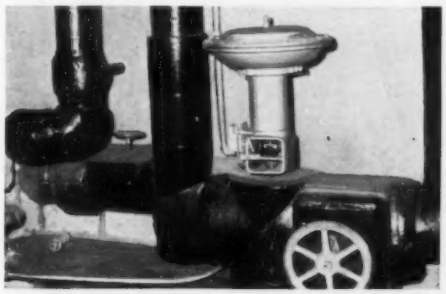
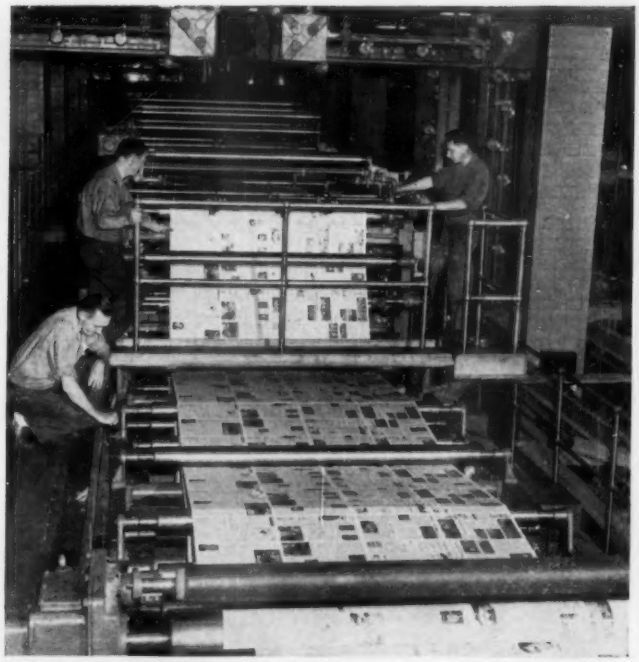
Rotogravure Building, Triangle Publications, Inc., Philadelphia. Albert Kahn Associated Architects & Engineers, architects and engineers, Detroit; Eggly-Furlow Engineers, mechanical engineers, Philadelphia.

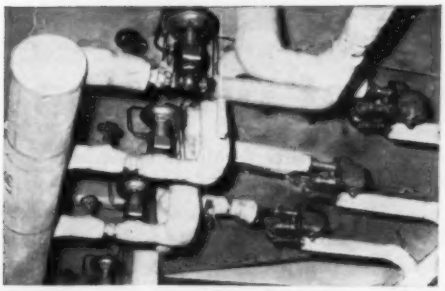


AIR CONDITIONING. A Johnson 3-Way Mixing Valve, with Pilot Positioner, gives precision control of chilled water supply to a unit serving a processing area.

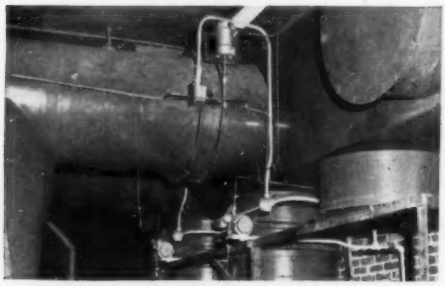


HEATING and VENTILATING. Strategically located Johnson Thermostats regulate heating and ventilating systems for huge press rooms housing 61 giant, high speed press units. Johnson Humidostats closely control relative humidity also.

INTRICATE CONTROL PROBLEMS CORRECTLY SOLVED by JOHNSON



REHEAT COILS are controlled by Johnson Steam Valves in response to demands from Room Thermostats. Pilot Positioners provide maximum, accurate repositioning power.



SOLVENT RECOVERY SYSTEM receives vapor-laden air at rate of 1500 cfm from each press unit. Johnson Static Pressure Regulators and Damper Operators help insure safe air movement through enormous duct system.

Triangle Publications' impressive Rotogravure Building is one of the largest and best equipped gravure plants in the world.

Dependable control of temperatures and humidities is essential in an operation this size. Processing requirements, product protection, worker comfort, safety and operating costs are among the complex factors which must be resolved correctly.

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In addition, other Johnson controllers are applied to the solvent recovery, waste paper pneumatic conveyor, paper handling, ink handling and exhaust systems.

How about your control problems? Whether they involve a simple application of one or a few controllers, or the installation of an intricate temperature, humidity or process control *system*, look to Johnson for the correct answer. An engineer from a nearby Johnson branch will gladly give you his recommendations without obligation. Johnson Service Company, Milwaukee 1, Wisconsin. Direct Branch Offices in Principal Cities.

JOHNSON CONTROL

TEMPERATURE ⇅ AIR CONDITIONING

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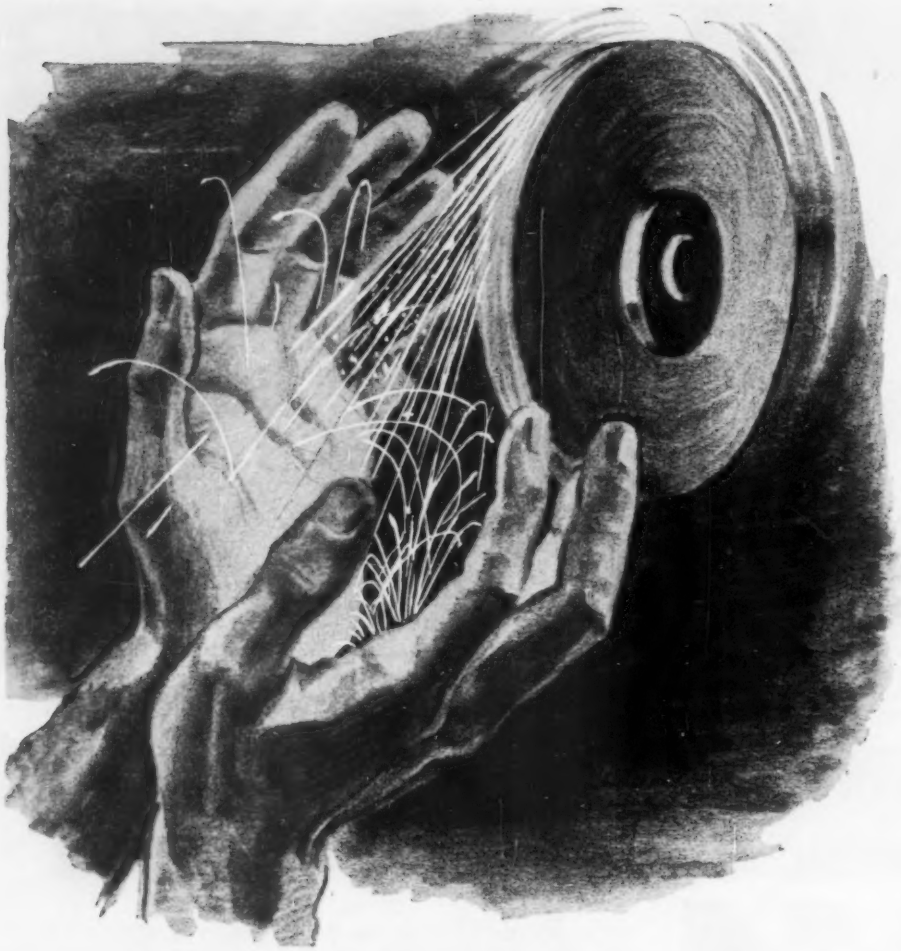

Taking the Grime out of Grinding

AS industry's most universally used piece of equipment, the grinding wheel is also one of its major dust sources. Almost a quarter century ago, AAF singled out this tool as a prime target for dust control.

The goal—effective, low cost dust removal from the work area without restricting efficiency of the grinding operation. Today, thousands of grinders—bench, stand, portable, swing frame and high speed production units—are served by AAF Dust Control Equipment with lower maintenance costs, better employee and community relations as the inevitable results.

Over the years, AAF, through continued research and product development, has extended these benefits to practically every industrial dust producing operation. One of its sales engineers is located in your area—ready to place at your disposal the world's most complete line of dust control equipment backed by a success record unmatched in the industry. Call him today or write direct.

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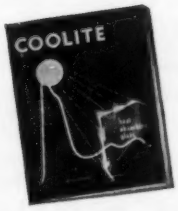
Harry A. Thomsen & Aleck L. Wilson, Architects • Swinerton & Walberg Co., Contractor • East Bay Glass Company, Glazier

Coolite Glass Keeps Production in Better Sight in New California Supplies Center of Pacific Telephone and Western Electric

Mississippi's Coolite wire glass, used in this modern plant, keeps work areas and offices literally loaded with daylight . . . provides plenty of conditioned, natural illumination for easier seeing, greater comfort and added safety. For Coolite, Heat Absorbing, Glare Reducing glass permits use of vast areas of glass without distracting, discomforting glare . . . absorbs up to 50% of solar heat rays to eliminate unwanted heat. The attractive Luxlite pattern diffuses softened daylight deep into interiors, avoids harsh shadows and sharp contrasts. Workers see better, feel better, work better in Coolite-conditioned daylighting. Brighten your production picture with Coolite. When you build or remodel your facilities, consider Coolite. Find out how Coolite, Heat Absorbing, Glare Reducing glass can keep costs down, boost employee efficiency, lighten load on humidification and air conditioning equipment.



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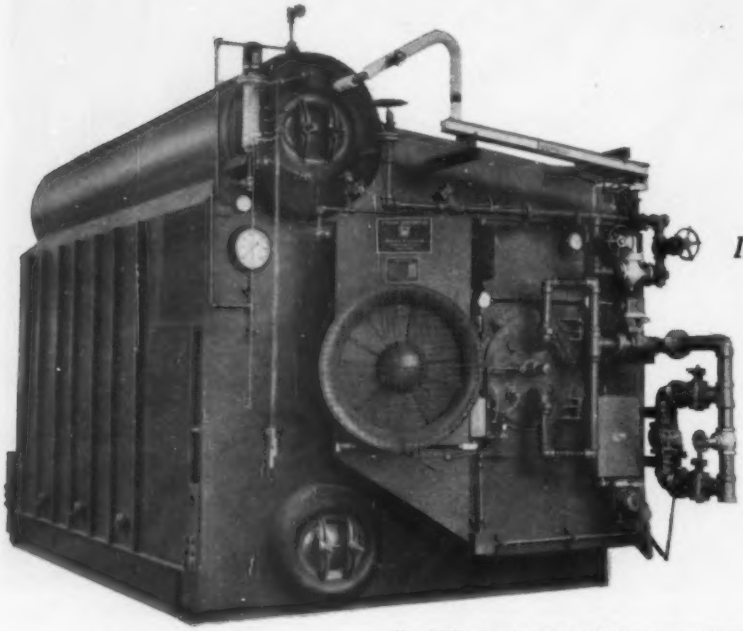
15 YEARS EXPERIENCE

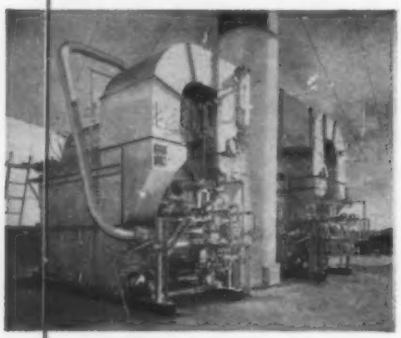
in packaged steam generators



In 1940 the original water-tube packaged steam generators —two Foster Wheeler units— were installed for oil field drilling operations.

New Foster Wheeler Series AG-100 Packaged Steam Generator.

Two FW packaged boilers—the first ever offered to industry—were installed in 1940 and are still in service delivering low-cost steam.



Now, with many successfully operating packaged units in service for processing, heating and generating, backed by 60 years experience in the power industry, Foster Wheeler offers the new "Series AG-100".

The new Series AG-100 shop-assembled water-tube steam generator is supplied for capacities from 10,000 to 46,000 lb steam per hour for oil or gas firing. It provides such significant advantages as baffled steam-collecting internals, the most efficient boiler surface arrangement, tangent furnace side wall and roof tubes which minimize refractory maintenance and provide cool operation, greater adaptability and accessibility.

For more detailed information, write for new catalog PG-55-3, *Foster Wheeler Corporation, 165 Broadway, New York 6, New York.*

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COURT DECISIONS — a summary of legal findings of interest to the plant engineer

Prepared by Albert Woodruff Gray

Loss of Profits as Damages

SUIT BROUGHT by a manufacturer for the price of two progressive dies was met with a counterclaim by the purchaser for $130,000 for loss of profits under a contract with the United States for 750,000 sets of plugs and flanges.

Endorsed at the bottom of the order for these dies was, "Priority rating DO-08: Contract No. DA 11-009 Q M 6083 O. I. 7567-GS-51."

In denying the customer a recovery on this counterclaim for these anticipated profits under other contracts in which these dies featured, the court said,

"Before loss of profits can be used as a measure of damages the contract should expressly or by implication from its terms contemplate such damages. The defaulting party must fairly be presumed to have understood the extent of his liability for loss of profits and to have assented thereto. A loss of profits when used as a measure of damages should be fairly compensatory to the purchaser and not unjust to the seller.

"In the instant case the only reference to any contract which might involve the loss of profits is the notation on the order which showed that the dies were being made in connection with governmental work. That is clearly not enough to establish that thereby it was expressly or by implication agreed that damages for loss of profits was in contemplation." Flug v. Craft Mfg. Co., 120 N.E. 2d 666, Illinois, June 22, 1954.

Restriction On Employment

PROVISION IN AN employment contract made by a New York glass fiber plant was, "In consideration of his employment in a confidential capacity, the employee agrees that he will not for a period of two years after leaving the company's employ enter the employ of any person or persons, firm or corporation engaged in the manufacture of any device or appliance similar to the device or appliance being manufactured by the company or for the manufacture of which the company may prepare during the period of his employment by the company."

In granting an injunction restraining this employee from a violation of this covenant in an action brought by the employer after the termination of the agreement, the New York court said,

"The preponderance of authority favors the enforcement of negative covenants in an employment contract which limit employment in a competitive business where the information and knowledge of the production and manufacturing processes acquired by the employee would, if disclosed to a competitor harm the business of the employer." Eraser Co. v. Kaufman, 138 N.Y.S. 2d 743, New York, March 10, 1955.

Water Tank Ordered Dismantled

SUIT WAS BROUGHT against a plant manufacturing refrigerators on land zoned as residential by a New Jersey borough. The plant owners however had been operating this plant when the premises had been so zoned. Later a permit had been issued by the borough for the construction of a 250,000 gal water tank for fire protection.

This action was brought by property owners for an injunction against what they claimed to be a violation of the zoning ordinance. It was contended by the plant owners that the tank was no departure from the manufacturing operations and had been constructed simply for protection in the event of fire.

"Such argument," said the court, "is not tenable as a justification of the construction of the gargantuan tank as a new structure separated about 65 ft from the main building. Carried to its logical result the argument is that if a non-conforming use is once established on property that use may be extended and enlarged to the length and breadth of the entire plot without restraint as to height or depth. We do not understand that to be the law. It is the policy of the law to restrict, closely, uses which do not accord with the zoning ordinances. Although they may be continued, they may not be enlarged or extended." Borough of Rockleigh v. Astral Industries, 102 Atl. 2d 84, New Jersey, December 24, 1953.

Confiscatory Zoning

WHEN A LOT in Detroit, Michigan, opposite the Detroit City Airport, was zoned for residential occupancy its owners sued the city for an injunction against the enforcement of the ordinance, contending that it was arbitrary, unreasonable and confiscatory.

For residential purposes the plot was valued at $9,220 and if light manufacturing were permitted the approximate market value was estimated at $60,000.

"In determining whether the invasion of property rights under a purported police power is unreasonable and confiscatory," said the court, "the extent to which the property values are diminished by the provisions of the zoning ordinance must be given consideration.

"The limitations imposed by the ordinance upon the use of this property prevents it from being utilized for purposes consistent with its location. If such restrictions are permitted to continue the property will for all practical purposes be of little use to anyone. It will remain 'problem property' contributing little or nothing to the economy of the city.

"On the other hand, it does not clearly appear that the public health, morals or safety are materially enhanced by such use restrictions. Under all the circumstances we are of the opinion that the use limitations imposed upon this property by virtue of the city's zoning ordinances are unreasonable, and confiscatory and therefore invalid." Pettersen v. Dombrowski, 60 N.W. 2d 456, Michigan, October 5, 1953.

Claim Of Joint Liability

JUDGMENT FOR damages was recovered against a New York power company when an employee was electrocuted by the contact of contractor's equipment with high voltage wires of the power company. After it had paid this judgment the power company sued to recover the amount from the contractor.

In its defense the contractor maintained that as the power company was equally negligent by failing to warn the employee of the presence of these high voltage wires and to shut off the current, it was barred from a recovery.

In holding that the power company was entitled to maintain this action the court said,

"It does not follow that constructive knowledge is sufficient to charge the power company as an active wrongdoer. It is the failure to act after actual knowledge of the existence of the dangerous situation that spells out active negligence. The mere knowledge

COURT DECISIONS

that the wires were there at a location 27 ft above the ground does not of itself constitute knowledge of the dangerous condition. Although fraught with potential danger it required the interposition of the contractor's equipment in proximity thereto to create an actual danger. The power company had no knowledge of the movement of the equipment upon its premises, consequently it had no knowledge of the actual danger. If it had been on the premises and witnessed the activity, its failure to act would have constituted active negligence." Central Hudson Gas & Electric Corp. v. V. J. Costanzi, Inc., 140 N.Y.S. 2nd 185, February 24, 1955.

Right To Electric Current

OWNERS OF A New York City plant sued an electric utility company for a judgment directing the company to supply it with direct electric current. The plant owners in this action relied on a statute of that state that, "Gas and electricity must be supplied on application. Upon written application of the owner or occupant of any building within one hundred feet of a line of an electric corporation and appropriate to the service requested, such company shall supply electricity as required."

In its denial of the application of these plant owners for direct current in place of alternating electric current, the court said,

"This provision does not prescribe any particular type of characteristic of electricity which the utility customer is entitled to demand and an electric utility obligated to furnish. The expressions 'appropriate to the service requested' cannot reasonably be interpreted to mean a direct current or alternating current or current of any specific phases. Furthermore, it appears it is highly feasible for these plant operators to secure a supply of direct current either by using a transforming device or by operating the electric plant on the premises." Meerow Press, Inc. v. Consolidated Edison Co., 95 N.Y.S. 2d 55, New York, January 9, 1950.

Smoke Violation

EMISSION OF dense smoke from steam boiler stacks in a New York City building were charged to be a violation of the anti-smoke ordinance of that city by the Smoke Control Bureau Inspector.

This building was equipped with the latest smoke abatement devices available, which conformed to the recommendations of the Bituminous Coal Research, Inc. and had been installed in accordance with the New York City Administrative Code. Further, all the necessary installation permits and operating certificates had been issued.

At the time of this incident a good grade mixture of soft and hard coal was used with air jet operated boilers and a forced draft creating maximum combustion.

In its decision of these proceedings the court said of incidents of this character, "Smoke is finely divided carbon or soot resulting from the decomposition of hydrocarbon vapors when heated to a high temperature with insufficient oxygen to burn them. Since this form of carbon is difficult to burn the fundamental principle of smoke abatement is not to burn smoke after it is formed but to prevent is formation in the first place.

"Overfire air jets do this by forcing air into the furnaces where it is needed and mixing it with unburned gases. This installation however as well as all other overfire air installations cannot completely eliminate smoke under all conditions."

In its conclusion that this plant operator was not guilty of this violation, the court added, "If the owner has complied with the literal requirements of the laws as nearly as it is practical to do so and has adopted the best devices presently known to all, then the letter and spirit of the legislation has been complied with. The law does not seek to compel a man to do that which he cannot possibly perform." People v. Oswald, 116 N.Y.S. 2nd 50, New York, October 7, 1952.

Catalog Copyright Worthless

A MICHIGAN tool manufacturer sued for what it claimed was an infringement of the copyright of its catalog. The pamphlet was made up of thirty-four loose pages and a brown paper back, held together by paper fasteners through eyelet perforations at the left margin of the sheets.

On the first page was, "This is a complete set of full size template tracing sheets," followed by the name, address and telephone number of the manufacturer. On the reverse side of this sheet was a description of the company and the catalog with the head, "Four Pages of Quality Tools."

The next page carried two designs with descriptions of jigs. The next page had a head, "Automatic Fixture Lock," followed by a description of structure, operation and effects. The reverse side of this second page was devoted to illustrations of spring jig parts and on the next page were more illustrations with tables and data of "Rapid Fixture Clamps" on the back.

Half of the fifth page was filled with the drawing of a typical milling fixture and a description of the use of the manufacturer's clamps with, at the bottom of the page, the notice of copyright. The succeeding pages were devoted to templates for tracing.

The Federal Copyright Statute provides, "The notice of copyright shall be applied in the case of a book or other printed publication upon its title page or the page immediately following."

The Federal Court in dismissing the copyright infringement suit brought by this manufacturer said, "The title of this catalog appears on the first or cover page and nowhere else, in the opinion of the court. And there is no notice of copyright in accordance with the statute, thereby rendering the copyright defective and invalid." Siewek Tool Co. v. Morton, 128 F.S. 71, Michigan, December 31, 1954.

Adjacent Owners

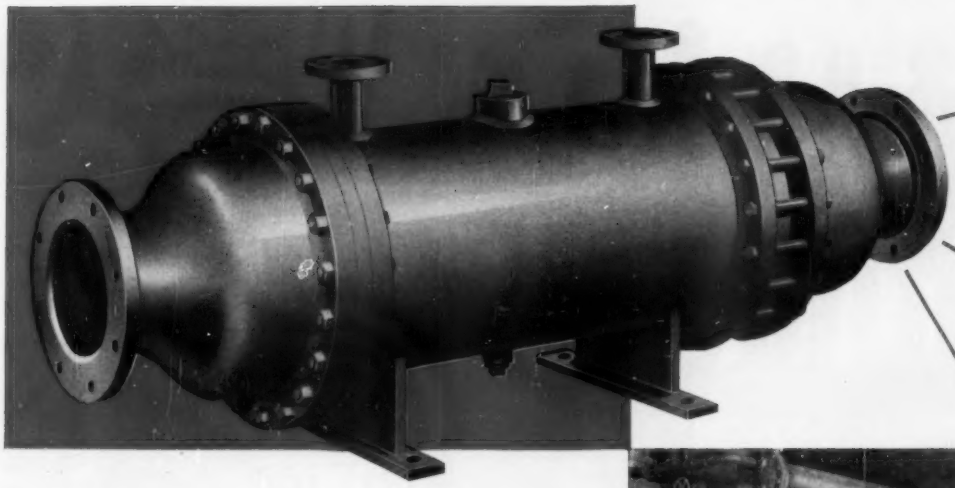
LAND IN THE industrial section of a Texas city was sold for use as a machine shop and foundry. Later a heavy forge shop began operating on a 24-hour schedule. About 33 years after the purchase of the land for use in this manner the heirs of the grantor maintained that the use of this property for such purposes was an invasion of their rights and a nuisance to be abated.

In an action brought by this plant for a determination of its rights, the Texas court said of this complaint,

"They are estopped to complain of the plant's ordinary, careful and prudent installation and use of the forging plant on that property and it was in the contemplation of the parties that whatever type of machinery or hammers would ordinarily be used in such a forge shop in the future, was legal within the contemplation of the parties.

"The plant would certainly not be required to continue to operate its forge plant with the same type of machinery and the same size hammers which it had and was using at the time the property was bought.

"It was naturally to be expected and contemplated that when the plant bought the property and acquired the right to operate thereon a forge shop, it could thereafter operate whatever type of machinery and hammers the growth of its business and the development of the industry in which it was engaged would require it to use in the course of its business." Ainsworth v. Oil City Brass Works, 271 S.W.2d 754, Texas, September 23, 1954.



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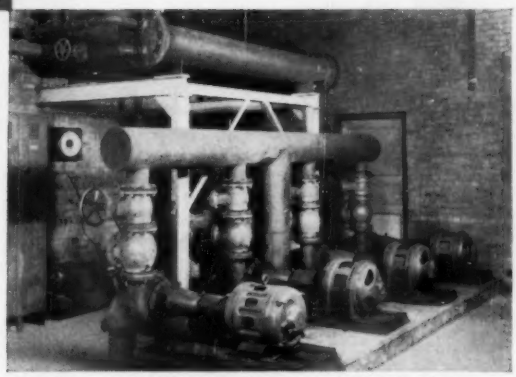

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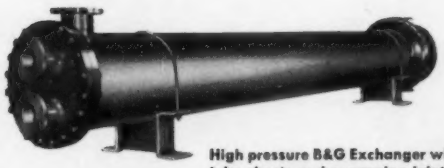
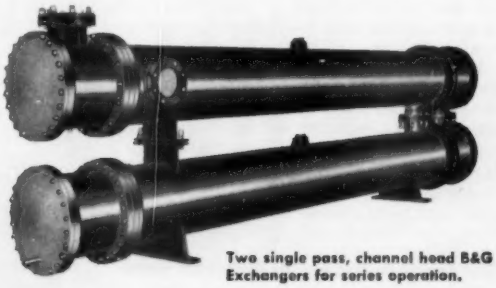
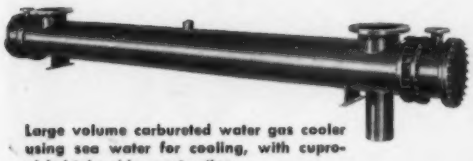


High pressure B&G Exchanger with fixed tube sheets and expansion joint design.



Two single pass, channel head B&G Exchangers for series operation.



Large volume carbureted water gas cooler using sea water for cooling, with cupro-nickel tube-side construction.

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The deep (1¾″) corrugations of Alcoa V-Beam permit roof slopes as flat as 2 inches in 12 inches. At the same time, these deep channels provide a pleasing, modern appearance.

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Light, strong, maintenance-free, Alcoa Aluminum Sheet and Fasteners are making possible new types of construction at lower-than-ever cost. You get better-looking, easier-to-erect, maintenance-free buildings. You get the advantages of aluminum's reflectivity to keep buildings 15% cooler in summer and warmer in winter.

For full information on V-Beam . . . (1) Write for the new AIA Data Sheet; (2) Ask for the names of competent nearby firms specializing in aluminum construction; (3) Call the nearest Alcoa sales office and request the help of an Alcoa architectural consultant. ALUMINUM COMPANY OF AMERICA, 861-A Alcoa Building, Pittsburgh 19, Pa.

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Lengths	5′ to 18′ in 6″ increments
Sheet thickness	0.040″
Sheet width	41⅛″ (approx.)
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Depth	1¾″
Top and bottom flats	¾″
Finish	Stucco (E-5 pattern)

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(Safety factor of 2)

Purlin or Girt Spacing	Load (lb per square foot)
10′-6″	21
10′-0″	23
9′-6″	25
9′-0″	28
8′-6″	32
8′-0″	36
7′-6″	41
7′-0″	47
6′-6″	55
6′-0″	65
5′-6″	78
5′-0″	95
4′-6″	118

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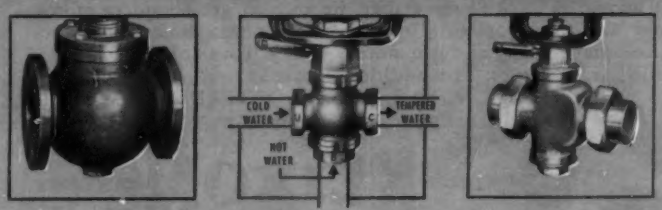

Various Valve Bodies and Inner Valves are available. Single and Double Seat Valves thru 2" have rugged bronze bodies with bronze union connections for quick, easy installation. Bulletin 329 gives information about all types.

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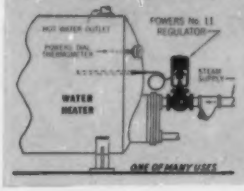
Often repays its cost 3 to 6 times a year when used on:



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ONLY POWERS No. 11 REGULATOR Offers ALL These Advantages

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- **Powers bellows has 50% more power** than used in the majority of regulators. The heart of a self operating regulator is its bellows. Powers with its 50% greater effective area gives better control and its durable 2 ply bellows outlasts ordinary single ply bellows.
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- **60°F. temperature ranges** available with accuracy of ±1°F. on some processes and 2 to 3°F. on others.
- **Rugged bronze valve bodies with bronze union connections,** for single and double seat valves thru 2", reduce installation time and labor. Larger sizes have flanged iron body valves.
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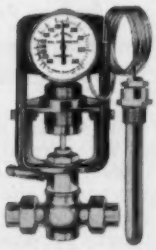

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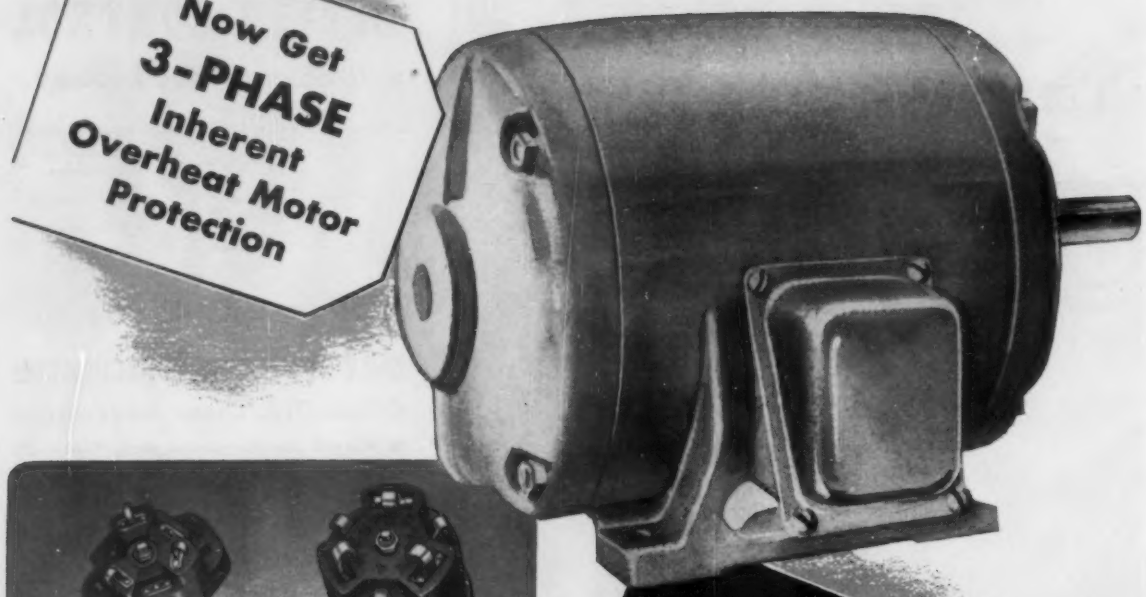

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★ *Plus maximum motor capacity under any conditions*

Klixon Protectors in your 3-phase motors, single and dual voltage, are a sure way to keep today's rising operating and replacement costs down.

Built-in as an inherent part by the motor manufacturer, the Klixon Protector saves money and reduces idle machine time by preventing the motor from burning out under the following conditions:

1. Extremely heavy overloads
2. Single phasing
3. Stalling
4. Failure to start
5. Lack of ventilation
6. Increase in ambient temperatures
7. Plugging or reversing duty

This means that you have less equipment shutdowns . . . less motor repairs and replacements.

Klixon 3-phase Motor Protectors are available in four sizes — covering a range of horsepower ratings from fractional up through 7½ hp. (600 V.).

And remember, be sure to get complete motor protection in your single phase motor, too. Specify and use motors with Klixon Inherent Protectors. The additional cost is low . . . the savings high. Write for Bulletin MOPR1 which explains inherent motor protection.

KLIXON

METALS & CONTROLS CORPORATION
SPENCER THERMOSTAT DIVISION
4501 FOREST STREET, ATTLEBORO, MASS.

For more facts circle 563 on Reply Card

Burroughs gets "bonus" lighting with Day-Brite **CFI** industrial fixtures

Portion of the Plymouth, Michigan, plant of Burroughs Corporation, equipped with Day-Brite CFI lighting.

61105

"DECIDEDLY BETTER"
DAY-BRITE®
Lighting Fixtures

Burroughs

Day-Brite Lighting, Inc.
5439 Bulwer Ave.
St. Louis 7, Missouri

Observe the comfortable, over-all illumination in this large work area—especially at the far end of the long run of Day-Brite CFI (*Comfort For Industry*) fixtures. Better than words, it illustrates the principle of this new system of industry lighting.

CFI units are designed with slotted areas in the tops of the fixture reflectors—thus *a portion of the light is directed upwards.* This provides extra light at no extra cost—effectively washes out ceiling contrasts, reduces eye fatigue and consequent worker discomfort. It results in greater accuracy, more safety, less spoilage, better production.

Two types of Day-Brite CFI fixtures are available: The CFI-10 with a 10% upward lighting component; the CFI-25 with a 25% upward component.

SEE, EXAMINE AND COMPARE Day-Brite with any other fixtures. Ask your Day-Brite representative to show you the difference.

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING EQUIPMENT

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COMPLETE LINES OF WALWORTH VALVES for POWER PLANT SERVICE

Featuring Walworth Pressure-Seal Valves

Here are cast steel valves built for high-pressure, high-temperature service. The unique bonnet-to-body design utilizes internal line pressure for a tight, leakproof connection. The higher the pressure the tighter the bonnet joint! Bulky, heavy bonnet flanges, bonnet studs, and nuts are completely eliminated providing a modern valve design of truly streamlined proportions. Maintenance is simplified as Walworth Pressure-Seal Valves are easily assembled, disassembled, and insulated.

Walworth Pressure-Seal Valves are available in Series 600, 900, 1500, 2500, and in a wide range of sizes and types. Complete information is available from your nearby Walworth Distributor—or—write Walworth for for a free copy of Circular 16.

and including these valves for "*'round-the-plant*" use!

WALWORTH SMALL CAST STEEL Y-GLOBE VALVES. Simplified design eliminates many of the problems encountered in high-temperature, high-pressure service. No bonnet joint. Improved back-seat design means longer life for packing rings.

WALWORTH LUBRICATED PLUG VALVES. Easy turning—quick operating. Lubricant can be renewed while the valve is in service. Lubricant completely surrounds the plug ports for a tight seal against leaks. Remember, always use Walworth Lubricant in Walworth Lubricated Plug Valves.

WALWORTH BRONZE VALVES. Standardized lines of bronze valves provide an unsurpassed system of interchangeability of parts, drastically reducing inventory problems. Walseal Valves with brazing ends also available in a variety of types.

WALWORTH IRON BODY GATE VALVES. Straight-flow port design reduces fluid turbulence to a practical minimum. Seat rings of end-seated type are screwed into the body. Brass liner on glands assures greater resistance to corrosion and scoring. Available with threaded or flanged ends.

WALWORTH CAST STEEL GATE VALVES. Bolted bonnet, wedge gate, OS&Y. Bonnets and bodies are engineered to withstand pressure and minimize distortion. Heavy steel walls provide extra strength and longer life. Deep stuffing boxes in all sizes (2" to 24") insure tightness and maximum packing life. Also available in globe and angle types.

WALWORTH also offers Plastic Valves, Fittings, *and* Pipe of polyvinyl chloride, moulded to Walworth's specifications by General American Transportation Company of B. F. Goodrich Chemical Company Geon!

WALWORTH

Manufacturers since 1842

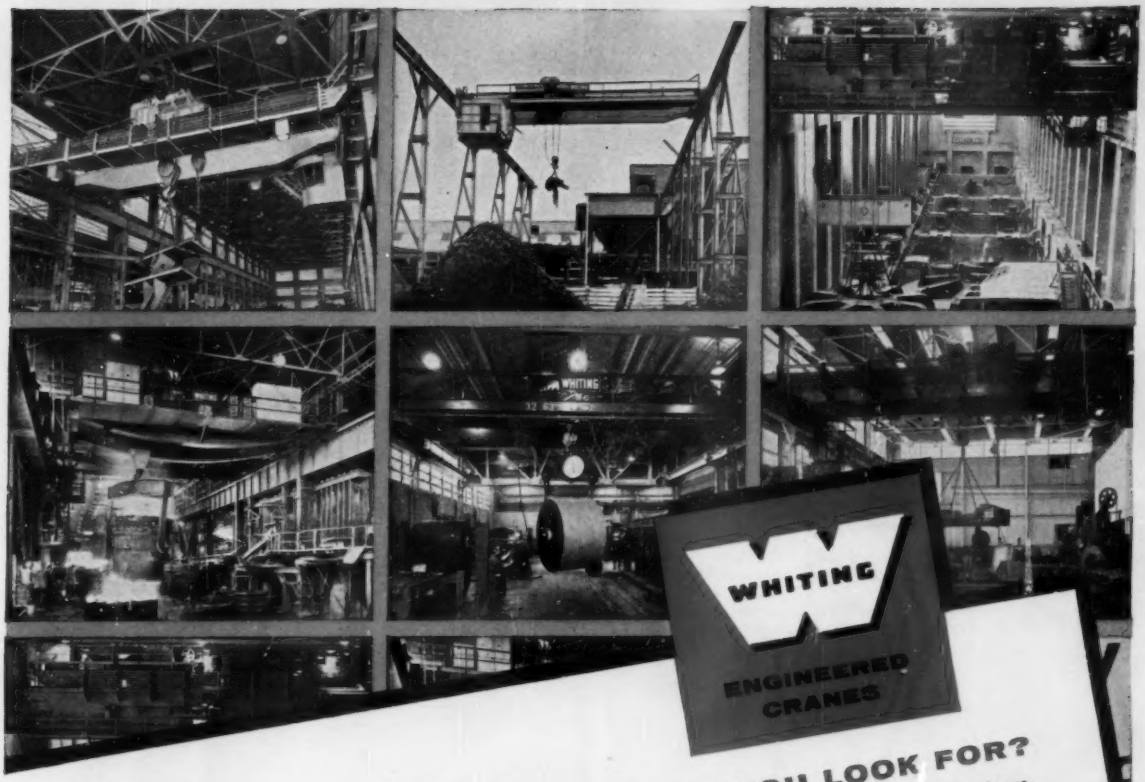
valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

Walworth Company of Canada, Ltd., Toronto

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

For more facts circle 565 on Reply Card



In Buying a Crane

WHAT DO YOU LOOK FOR?

You look for *many* things in a crane . . . performance, high quality of parts, outstanding features, a fair price. But how do you *know* you will get them? *Here's how!* Seek the counsel of a manufacturer who has had many years of crane building experience and who can show you outstanding examples of engineering. Talk over your requirements with men who can advise you of recent crane developments and who have helped plan important installations in firms throughout the world. Do business with people who have a reputation to uphold and who accept responsibility *after* as well as during installation.

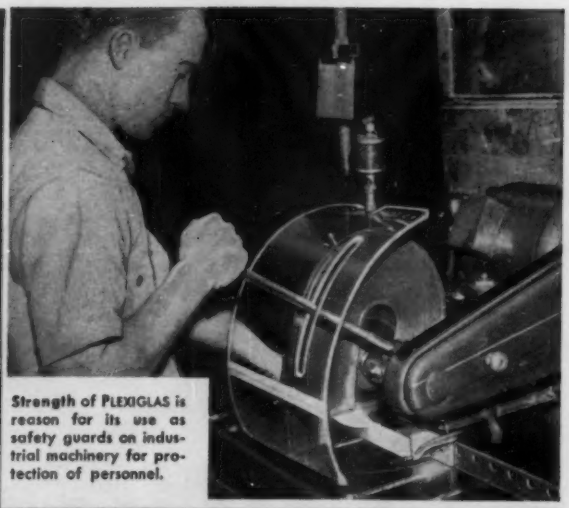
Look to Whiting for all of these things. Let us tell you about them now!

WHITING CORPORATION
15675 Lathrop Avenue, Harvey, Illinois

Get the facts now—
send for Bulletin No. 80,
"Whiting Engineered Cranes."

For more facts circle 566 on Reply Card

Acid-resistance of PLEXIGLAS permits safe inspection through corrosion-proof shields, like this hood over etching equipment.



Strength of PLEXIGLAS is reason for its use as safety guards on industrial machinery for protection of personnel.

Transparency of PLEXIGLAS provides all-around observation. Example is this tank for breakdown testing of transformer coils.

Breakage-resistance of PLEXIGLAS results in minimum replacement costs when material is used for window glazing.

Plexiglas—useful in so many ways around the plant

PLEXIGLAS® acrylic plastic is a mighty handy material around a plant. Shown above are just a few of the many ways it is being used to provide safety, increase efficiency and reduce costs in industrial operations.

PLEXIGLAS has crystal-clear transparency, great strength, and is light in weight. It is resistant to most chemicals. Electrical properties are excellent. The long-established reputation of PLEXIGLAS as "the outdoor plastic" indicates its durability under severe conditions of use, indoors or out. In addition, PLEXIGLAS can be heated and formed to almost any shape, can be sawed, drilled and machined like wood or soft metals. A brief investigation will show you many places in *your* plant where a material with this combination of advantages can be used profitably.

PLEXIGLAS R, the lower-cost grade, is especially suitable for industrial plant applications. Call your nearest dealer for information and quick delivery. Dealers are listed under PLEXIGLAS in classified telephone directories of most cities.

Send for This Booklet
Our "Design and Fabrication Manual" tells how to work with PLEXIGLAS. We will be glad to send you a free copy.

Chemicals for Industry

ROHM & HAAS COMPANY

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7th National Plant Maintenance and Engineering Conference and Show Section

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Conference and Show, January 23-26, 1956

See the Plant of 2005 A.D. at Plant Engineering's Booths 1401-1402

The Plant Engineering Triumvirate

AFTER A DECADE of rapid progress in the field of plant engineering and maintenance, it is time to stop and take stock of the recent developments in this field of specialized engineering. The emergence of plant engineering as a profession in its own right has not been the result of a revolution but rather of an accelerated evolution. Many factors and forces are responsible.

For one thing, automatized production and control has forced a greater awareness of maintenance. It is no longer the stepchild of industry; it is now the hand maiden of production. The oldfashioned concept of the roughneck maintenance man has been dispelled by the increasing numbers of alert, well-trained technicians and engineers to whom maintenance controls, and scheduled and preventive maintenance, are the bibles of their profession.

Evolution in all things follows a pattern. It makes little difference what is being evolved. As conditions change the individual organism must adapt. This is true even of industrial organizations. Indeed, in industry the whole process can be, and is, speeded up.

In a single-celled organism there is no specialization; respiration, reproduction and other fundamental functions take place with no need for separate organs. In the intricate mechanisms, such as man, each and every function is the responsibility of an individual organ or group of organs. But, if any one of them is incapacitated the well-being of the entire organism is endangered.

And so it has happened in industry. In the old single-cell, hand-crafting days, each artisan sat at his bench unaffected by other artisans in other little shops. Today, industry is, for the most part, a complex of dependent, interrelated organs, each existing for and functioning for the common good. Sales, advertising, production, research, design, purchasing, accounting, personnel, public relations, legal, top management, and plant engineering, all have their well-defined spheres of responsibility. All of them work toward one objective: making a product economically and selling it for a profit.

As specialists, it was only natural that, in the course of events, groups of plant engineers would form for the discussion of mutual problems. It was equally natural and fitting that the first such group to form was in the cradle of American industry — New England. The initial suggestion for such a group was made, about 40 years ago, by E. B. Freeman of the B. F. Sturtevant Co., and Henry S. Dennison of the Dennison Mfg. Co. About 25 plant engineers of the Boston area were invited to a dinner to discuss the formation of such an organization.

Not only was the organization formed under the title of The Plant Engineers' Club but, even more significantly, the early pattern established by this first group has been followed, in substance, by the many similar organizations which came later.

Many years elapsed before the second local plant engineers society was formed. Fred Gibson, one of the early members of The Plant Engineers' Club (Boston), moved to New York and soon afterward interested three other plant engineers in sponsoring a similar organization in that city. In 1945 it was officially organized as the New York Plant Engineers' Association.

Late in 1946 a small group of engineers in England organized the Incorporated Plant Engineers. It was the outgrowth of a government-sponsored group to expedite the wartime interplant flow of spare parts for all types of plant equipment, then in critical supply all over the United Kingdom. Charter members saw the advantages of continuing this group after the wartime necessity had passed and for even increasing its scope and broadening its interests. The rapid growth of this professional organization from the original seven men to its present 3000-plus members in 26 countries attests to the soundness of this thinking.

It was in 1943, also, that the publisher and editors of Technical Publishing Company, Chicago, were making serious study of the changing industrial picture. American industry, through the stimulus of wartime expansion, had accelerated its change from a Jack-of-all-trades operation into one which relied more and more heavily on the services of the specialist. All of these specialists were being served by one or more publications. The plant engineer, however, was being partially reached by many publications. Here, then, was the "householder" of industry, the equipper and maintainer of billions of dollars worth of plant whose need for specialized reporting was being diluted in many magazines.

Careful and exhaustive questionnairing, and hundreds of plant visits, reinforced the decision to produce such a magazine. Fathered by a group of editors all of whom had practical experience in some phases of plant engineering, the magazine, PLANT ENGINEERING, was born in November, 1947. It was a healthy infant, though small, and it went through many of the uncertainties of childhood. That it succeeded in attaining maturity is attested to by its growth of nearly 1400 per cent in eight years.

One of the first objectives of the young magazine was to do what all good business publications attempt to do: fight the battles of its readership and do its level best to make certain these readers attain their proper place.

1. American Institute of Plant Engineers

2. The Conference and the Show

3. Plant Engineering Magazine

Stimulated by the tremendous success of the first two local plant engineers' organizations—Boston and New York—the editors asked themselves why such organizations would not be of equal value to plant engineers everywhere. Therefore, in the spring of 1950, PLANT ENGINEERING started questionnairing key industrial areas across the country. The response was amazing. The first local society (after the Boston and New York groups) was the San Francisco Plant Engineers' Society, organized on March 21, 1950. This was followed rapidly by Rochester, N. Y.; Philadelphia; Chicago and Dayton, until, at the present time, there are more than thirty local groups in existence.

In general these groups, whether called clubs, associations, societies or groups, have the same objective of promotion of the profession, the discussion and study of common problems, and the sharing of experiences.

The first coordinated activity involving several clubs, was held in Philadelphia and Chicago in 1952. Members of the Boston, New York, Philadelphia, Chicago, Dayton, Calumet and Northern Illinois clubs participated in the program of the Plant Engineers Team from Great Britain.

More significant was the first joint meeting held by the Chicago Area clubs in November, 1952. This led to the first regional conference held in Whiting, Indiana, on November 17, 1953, with 75 representatives from four clubs, consisting of Northern Illinois, Chicago, Calumet Region and Marion, Indiana.

The third regional meeting on November 2, 1954 at North Chicago was the first to be billed as a program of the "American Institute of Plant Engineers—Third Annual Joint Meeting —Chicago, Calumet, Milwaukee and Northern Illinois."

It was at the Calumet meeting in November, 1953, however, that a national organization was first discussed. Later, officers of the three Chicagoland clubs met to consider the proposal and discuss the type of organization most likely to receive the approval of the majority of clubs already organized.

This proposal looked promising and it was taken up with other clubs. This led to what may be considered the first National meeting held on January 27, 1954, at the Stock Yard Inn in Chicago.

It was decided to act at once and incorporate a non profit organization to be called the American Institute of Plant Engineers.

In June 1954 a charter was granted by the Secretary of the State of Illinois. The first national event handled by a chapter of the new society was on December 2, 1954 when the Philadelphia Club sponsored the first evening program of the 1954 Power Show.

The first national business meeting of the AIPE was held in Chicago, January 23, 1955, with delegates from a score of clubs representing approximately 500 members.

The Show and Conference

The growth of the Plant Maintenance & Engineering Show from a small exposition in Cleveland in 1950 to one of the nation's five largest annual industrial expositions in 1956 parallels a complete change in industrial and engineering concepts.

When Saul Poliak, president of Clapp & Poliak, Inc., New York, the firm which produces the event, first conceived the idea for the show, many executives thought he was talking about displays of janitors' supplies, with some oil cans interspersed.

Indeed, after the first show proved successful, promotion for the 1951 exhibit had to be keyed to the theme that the mop and pail was not the dominant note of the show.

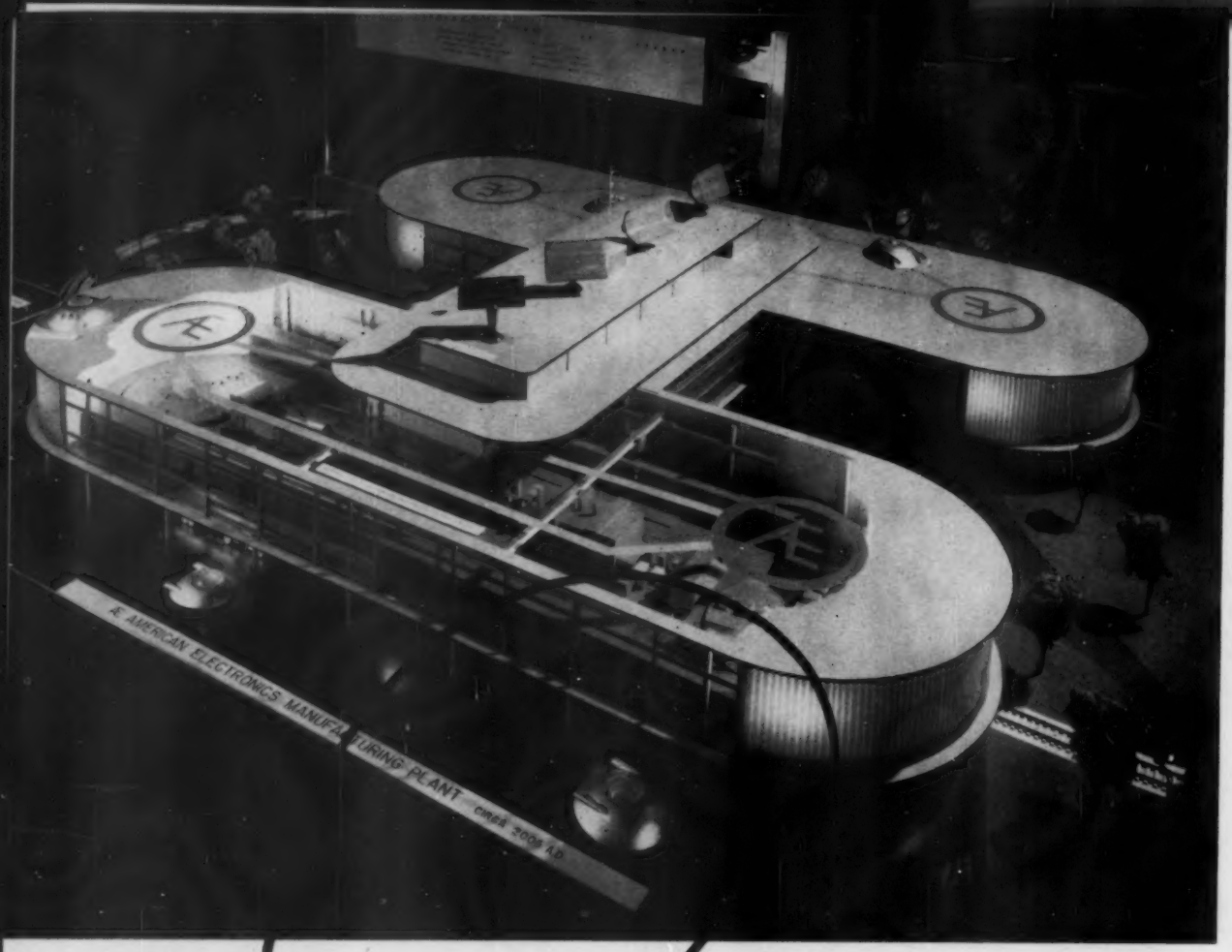
With the widespread, top-level attention paid to maintenance today, it is difficult to recall that the concept of maintenance was quite primitive in many circles even as recently as five years ago.

With the growth of understanding, the show has skyrocketed to the foremost ranks of industrial expositions. Today, only two cities in the entire country, Chicago and Philadelphia, have both the exhibition halls and hotel space sufficient to accommodate the show.

About 100 companies decided to pioneer in the development of the science of maintenance for the first show and it attracted a little less than 8,000 visitors. It was a small start, but a surprisingly good one. One of the most impressive aspects was the high quality of the engineering talent which turned out for the event.

From the start, the idea was to provide a complete education in current practices of maintenance. Consequently, a conference was arranged under the able direction of L. C. (Jack) Morrow, to offer the theoretical aspects, while the show gave the visitor a three-dimensional view of the equipment needed. In the early years, plant visits also were included.

Some four hundred companies will be exhibiting at the 1956 show and about 20,000 visitors are expected. It is a far cry from the humble beginnings of 1950. In 1950 there were 118 exhibitors, in 18,000 sq ft of floor space, and the exhibits were viewed by 7200 registered attendees. In 1955 there were 367 exhibitors, in 92,900 sq ft with an attendance of 21,000. Similar gains are expected to continue. The concept of maintenance has gone a long way.



A. Epstein, head of the firm of A. Epstein & Sons, Inc., points to one feature of the Plant of 2005 A.D.

Complete automation, solar energy generators, glowing ceilings, consumption-production analyzers, rooftop landing fields for flying saucers, turbo-jet cars, the four-hour day, remote-control materials handling. These are the components of the "Plant of 2005 A.D." as envisioned by an outstanding engineering firm.

The Plant of 2005 A.D.
Designed by: A. Epstein & Sons, Inc., Chicago
Model built by: A & A Models, Chicago

The Amazing Plant of 2005 A.D.

THIS IS THE PLANT of 2005 A.D. It bears little resemblance to even the most modern plant of the present day. As pointed out by A. Epstein, head of one of country's leading engineering firms, "Our buildings are rapidly undergoing a metamorphosis from the static 'roof-over-our-heads' type structure to the dynamic plant of tomorrow, an integral component in our industrial operation."

The design of this plant building is one such development of that trend. Walls in this building are not being used solely for the purpose of containing conditioned climate within an enclosure but are constructed of a plastic-like material that is capable of admitting sunlight during the day and radiating inward artificial light in the evening. In addition, the infrared radiation emitted from the walls will be thermostatically controlled for proper temperature gradation.

Heating Walls

This material, used either as a preformed structural panel or "painted" on the ceiling will practically eliminate today's network of lighting fixtures and heating equipment as we now know it. In this particular plant the floor too has become subordinate to the requirements of the operation; it is designed as a chassis to support the "machine." Raw materials are loaded onto this deck by means of the cranes operating through the bomb-bay-like doors seen on the receiving and shipping deck.

Cranes operate by remote control through a series of electronic relays actuated by the photoelectric cells at the truck stations below the operating deck. Trucks and railroad cars are all of the flatbed type since all materials, finished or raw, will be (in this plant) completely palletized.

Our plant of 2005 A.D. is engaged in the fabrication of phonevision sets (television-telephones will be quite common in the year 2005) and the parts will be fabricated and assembled under complete automation. It might be noted that with all the machinery involved, and with the rapid production of finished products, there is no storage space for either raw materials or finished products.

This same feature will hold in nearly all automated plants of 2005. The automatic plant can operate efficiently only when it is running. The speed of the plant, as a production "machine" will be gauged by a consumer analyzer which will automatically set the rate of production.

Production-Consumption

Of necessity, any manufacturer of mass-consumed items will be required to have his own market research and production-consumption department. He will not be concerned, as today, with costs per unit of production but rather with costs based on time of production at a given capacity rate.

Thus, warehousing will be a thing of the past, a fossil from an archaic past, made possible by a faulty distribution system.

Contrary to today's trend of locating plants away from the large metropolitan areas and nearer the "cheaper labor markets" this automatic plant will be in or near a large city.

This plant will be equipped with its own power plant—the sun accumulators on the roof of the superstructure. In fifty years, solar energy will be our major source of power. In the compartments of the superstructure will be atomic battery rooms for the storage of energy for evenings and days of inclement weather when the solar "take" will be low.

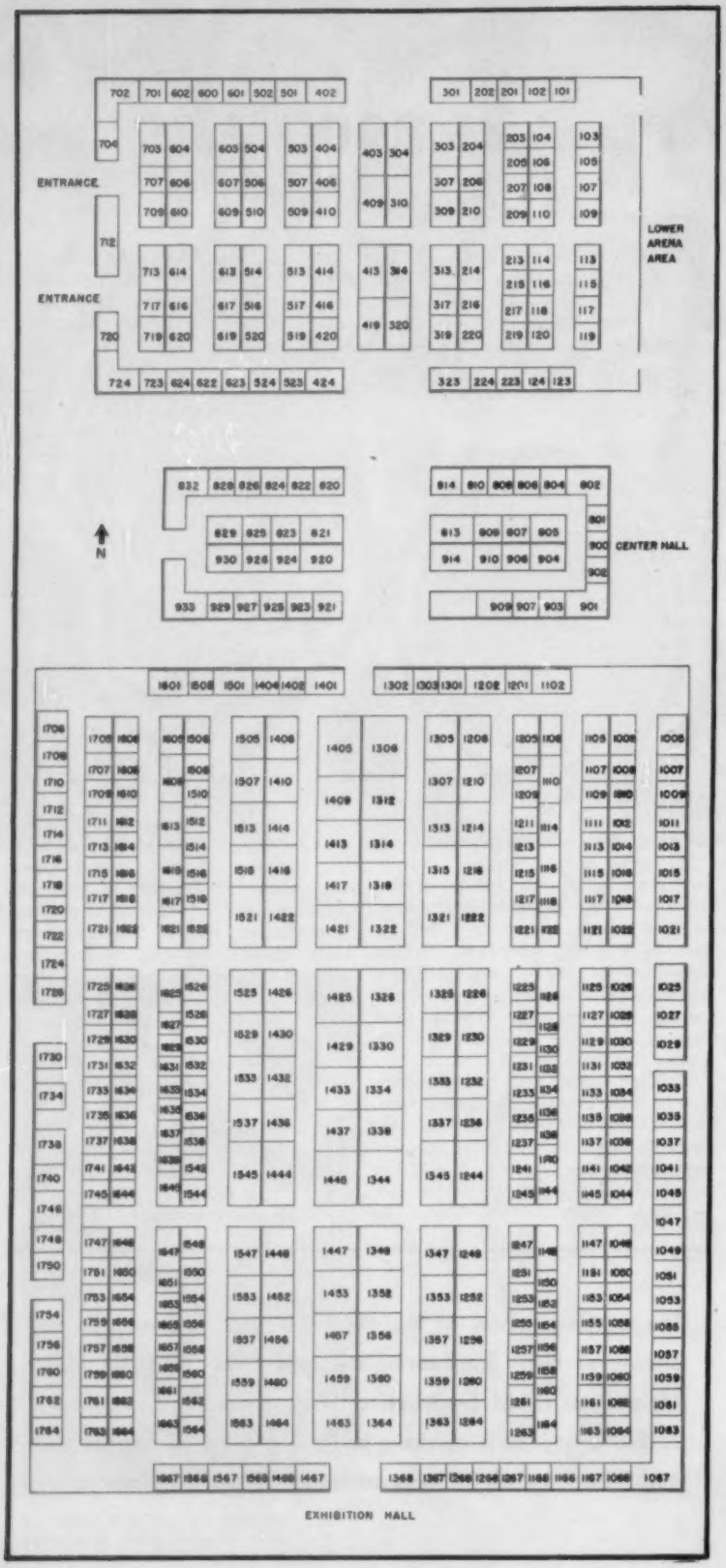
Neither traffic nor transportation will be a deterrent to the central location. The year 2005 will see us "jetting" to work in the flying saucers seen landing on the roof. It will not be uncommon for people to live two or three hundred miles away in suburban communities. For those living in the urban areas the automobile will still provide transportation but it will be powered by a "cigar-box-size" turbo-jet engine.

The design of this plant directly reflects the operation within its walls; hence, the architecture seen here will not necessarily be the same for other plants. This particular plant is composed of two production lines with office facilities centrally located between them. Although there are lockers and toilet facilities in the central section, there are no provisions for employees' lunch rooms. By the year 2005 the work day will have shrunk to four or five hours and lunch hours in the plant will be a thing of the past.

Building Maintenance Nil

As to those facilities provided they will not be as numerous as in today's plant since the entire plant will be operated with just a few men. The administration, plant engineering, and product design departments will have the greater personnel. As to plant engineering, the number of technical personnel will be engaged in production machine, control, and instrument maintenance. Building maintenance will be the smallest section in plant engineering. Construction of the plant will be primarily of plastic, aluminum, stainless steel, glass, and other non-oxidizing or slow-oxidizing metals and materials. Furthermore, all surfaces will be given negative static charges, and positive-charged air ducts located throughout the plant will pick up and deliver dust to atomic disposal units. In the year 2005 A.D. the world will be a cleaner place in which to live.

The working model of the Plant of 2005 A.D. will be on display at Plant Engineering's Booths 1401-1402, 7th Plant Maintenance and Engineering Show, Philadelphia, January 23-26. Everyone is cordially invited to drop in, inspect and push the controls of this amazing "Plant of Tomorrow"



This is the Floor Plan of Convention Hall — Site of the Seventh National Plant Maintenance and Engineering Show and Conference

Guide to Exhibits at Maintenance Show

With a Brief Description of the Displays

As a guide to plant engineers attending the Seventh National Plant Maintenance and Engineering Show and Conference, at Convention Hall, Philadelphia, January 23 to 26, here is a list of the exhibitors. Also included is a brief description of the products each company is displaying along with the names of the people who will man the booths. Please note that the booth number is indicated in the parentheses following the name of the exhibitor. (This list was as complete as we could make it at the time we went to press.)

Acme Steel Co (813, 914)
Dexion Division, Chicago 8, Ill.
Exhibit: Dexion Slotted Angle, Acme Steel Floor Plate
At the booth: W. B. Bender; R. J. Corbett; R. B. Dashiells; J. A. Gallagher; J. L. Kilgariff; R. H. McHenry; P. J. Peters; R. M. Snodell

Acme Visible Records, Inc. (1422)
Crozet, Va.

Aerol Co., Inc. (402)
Los Angeles 31, Calif.

Aeroquip Corp. (1507)
Jackson, Mich.
Exhibit: Low, medium, high pressure and special purpose industrial hose, fittings and self-sealing couplings
At the booth: M. Lloyd Jones; W. F. Rogge; R. D. Hitt

Aget Manufacturing Co. (1137)
Adrian, Mich.
Exhibit: Dust and mist collection equipment
At the booth: M. Olsaver; R. J. Comar; J. W. Roberts

The Airetool Manufacturing Co. (814)
Springfield, Ohio
Exhibit: Tube cleaners, tube expanding equipment
At the booth: I. T. Thornson; Wm. Smith; H. Russell

Ajusto Equipment Co. (1745)
Toledo 2, Ohio

Alan Wood Steel Co. (617)
Conshohocken, Pa.
Exhibit: AW Algrip abrasive rolled steel floor plate
At the booth: Leon J. Lieberman; Richard G. Fleming; William T. Haddon; Joseph Toth; William K. Fozard; George M. Callanan; Charles Neff, Jr.

Albina Engine and Machine Works (1556)
Portland 12, Ore.
Exhibit: Power driven scaffolds, Albina Climber and mechanical stirrups
At the booth: P. L. Symons; Eugene W. Hall; Lester G. Arellanes

Alemite Division (1202, 1301)
Stewart-Warner Corp.
Chicago 14, Ill.

Allis-Chalmers Manufacturing Co. (1326, 1330, 1425, 1429)
Milwaukee 1, Wis.

Aluminum Co. of America (1748)
Pittsburgh 19, Pa.

American Abrasive Metals Co. (1257)
Irvington 11, N. J.

American Chain & Cable Co., Inc. (1433, 1437)
American Chain Division
Bridgeport, Conn.

The American Floor Surfacing Machine Co. (1049, 1051)
Toledo 3, Ohio

American Hand Dryer Corp. (420)
Philadelphia 7, Pa.

American Hard Rubber Co. (1325, 1329)
New York 13, N. Y.
Exhibit: Corrosion resistant pipe, fittings, valves, pumps and utensils
At the booth: Joseph Kwederis

American-Olean Tile Co. (1363)
Lansdale, Pa.

American Pamcor, Inc. (516)
Havertown, Pa.

American Pullmax Co., Inc. (1025)
Chicago, Ill.

American Steel & Wire Division (1421)
United States Steel Co.
Cleveland, Ohio

Anderson-Prichard Oil Corp. (1064)
Oklahoma City 2, Okla.
Exhibit: Micro-Seal protective coatings for corrosion prevention and protection of thermal insulation
At the booth: E. J. Gunter; Sterling Harris; C. C. Allen; John P. McAuliff

The Arco Co. (1655, 1657)
Cleveland 27, Ohio
Exhibit: Arco Rays with fog control alkyd mill white, Arco Alkyd-Tint tinting paste, Dum Dum Masonoc, Non-Shrinking Dum Dum Calk, other protective coatings
At the booth: Curtiss Howard; H. N. Walker; Emil Coester; A. E. Davidson; James M. Scott; Wm. P. Scheu; Benjamin Cervas

Armstrong Machine Works (609)
Three Rivers, Mich.
Exhibit: Steam traps, air and air relief traps, humidifiers, strainers
At the booth: T. H. Rea; O. E. Ulrich, Jr.

Arro Expansion Bolt Co. (1109)
Marion, Ohio
Exhibit: Fastening and drilling devices for masonry
At the booth: James A. Mautz; William G. Eikenbary; John J. Dugan

Atkomatic Valve Co., Inc. (1614)
Indianapolis 20, Ind.
Exhibit: Solenoid valves, bronze and stainless steel pressures from 0 to 5000 psi
At the booth: Howard R. Taylor; Mark W. Lowe; John C. Whiddett

The Atlas Mineral Products Co. (1135)
Mertztown, Pa.
Exhibit: Corrosion proof construction materials for plant wide protection including: corrosion proof cements, tank linings, protective coatings, rigid plastic structures and rigid plastic pipe
At the booth: G. F. Gilbert, Jr.; E. Kirkpatrick; J. F. Baird, Jr.; A. A. Boova; D. Weidner

Automatic Electric Sales Corp. (1558)
Chicago 7, Ill.
Exhibit: Business telephone systems
At the booth: J. A. Webber; G. W. Donns; G. L. Petitgout

Baldwin Overall Service, Inc. (1266)
Philadelphia 22, Pa.

Band-It Co. (1128)
Denver 5, Colo.
Exhibit: Band-It industrial pressure clamps and fittings
At the booth: Val Lodholm; John C. Baldwin; J. H. Warner; A. W. Andrews

Barco Manufacturing Co. (820)
Barrington, Ill.

Barreled Sunlight Paint Co. (1303)
Providence, R. I.

Barrett-Cravens Co. (1553, 1557)
Northbrook, Ill.
Exhibit: An operating display of hand lift trucks, electric lift trucks, fork trucks, industrial tractors, Steeleg skids, portable elevators
At the booth: O. M. Lund; C. E. Barnes; Kenneth Shaw; M. G. Johnson

Barry Controls, Inc. (606)
Watertown 72, Mass.
Exhibit: Self-levelling Barrymount vibration isolators for metal-working machinery; punch press demonstration of "no-lagging" machine tool installation
At the booth: R. V. Weston; W. W. Frederick; John B. Gwynn; Morris Silverman

Remember AIPE Luncheon
January 24th
Tickets at AIPE Booth

W. M. Beshlin Co. (1007)
Grove City, Pa.
Exhibit: Complete line of industrial safety harnesses, eletrician's maintenance belts and holsters and linemen's equipment
At the booth: D. B. Elliott; D. L. Christley

The Bassick Co. (923, 925)
Bridgeport, Conn.
Exhibit: Complete line of casters
At the booth: A. J. Israel; Floyd Johnson; Dick Bragdon; Charles Bontems

Beaver Pipe Tools, Inc. (1213, 1215)
Warren, Ohio
Exhibit: Portable pipe machine, Beaver power drive threader, power unit and abrasive cut off machine
At the booth: E. R. Barkley

Benjamin Electric Mfg. Co. (1635, 1637)
Des Plaines, Ill.
Exhibit: Industrial lighting equipment, signals, and commercial lighting equipment
At the booth: Wes McCouch; Mike Flynn; Ray Corwin

Best's Safety Publications (1161)
A. M. Best Co., Inc.
New York, N. Y.

James G. Biddle Co. (622, 623)
Philadelphia 7, Pa.

Exhibit: Electrical testing instruments, speed measuring instruments, preventive maintenance test equipment for industry

At the booth: O. X. Heinrich; W. G. Long; John Familetti; A. Q. Lange; Konrad Loebl; E. D. Haigles; A. F. Zell; S. C. Sommer

Big Joe Mfg. Co. (201, 202)
Chicago 7, Ill.

Bil-Jax, Inc. (1601)
Archbold, Ohio

Exhibit: Tubular steel scaffolding and equipment

At the booth: Wilbur M. Wyse; C. C. Martin; Harold J. Short; E. M. Pierce

Binks Manufacturing Co. (603)
Chicago 12, Ill.

Exhibit: Spray painting equipment

At the booth: B. B. Roche; P. L. Griffin; J. E. Rowe; B. J. Hedger; George Cook; Blake Hopkins; A. W. Gudge; C. E. Flora; K. Osterstrom; C. E. Fuller; E. J. Cremer; R. C. Rorden; A. E. Cummins; F. Blanckmeister; B. Loomis; P. J. Peters; W. R. Benjamin; T. C. Campbell; J. E. Whitaker; Joe Carlin

The Black & Decker Mfg. Co. (1447)
Towson 4, Md.

Exhibit: Standard line of tools and accessories

At the booth: Eric H. Federschmidt; J. M. Charlton, Jr., F. T. Clark; R. R. Herrick; C. J. Pryer

Blackhawk Manufacturing Co. (1367, 1368)
Milwaukee 1, Wis.

Boiler Equipment Trust Co. (1757)
Amherst, Mass.

Bond Foundry & Machine Co. (1055, 1057)
Manheim, Pa.

Bonney Forge & Tool Works (1746)
Allentown, Pa.

Exhibit: Welding pipe fittings, mechanics' hand tools and Bonney X-4

At the booth: Joseph M. Potts; William Jackson; George Fritch; Harry J. Seaman; Richard Holmstrom; Robert L. Huston; Howard S. Rogers

Boston Gear Works (1738)
North Quincy 71, Mass.

W. H. Brady Co. (1629)
Milwaukee 12, Wis.

Exhibit: Self-sticking markers for maintenance identification, pipe marking, wire and conduit marking, aisle marking and accident prevention

At the booth: W. J. Tuite; F. C. Kluhsman; J. J. Duffy; P. Vienot

Brauer Electric Manufacturing Co. (1241, 1245)
Chicago 40, Ill.

Exhibit: Versatile Tornado Jumbo Cleaner, floor scrubbing machines, portable electric blowers

Brown Company (1235, 1237)
Boston, Mass.

Browning Manufacturing Co. (619)
La Mesa, Calif.

Brulé Incinerators (1705)
Chicago 5, Ill.

Buchanan Electrical Products Corp. (1251)
Hillside, N. J.

Buck Manufacturing Co. (1707)
North Aurora, Ill.

Bustin Steel Products, Inc. (1157)
New York, N. Y.

A. M. Byers Co. (414)
Pittsburgh, Pa.

C & D Batteries, Inc. (1114)
Conshohocken, Pa.

Exhibit: Storage batteries for electric industrial trucks, control and power applications (switchgear)

At the booth: C. F. Gross; R. H. MacDonald; H. Moorehouse; L. M. Eble, Jr.; S. W. Gibb; R. M. Pease

Canton Containers, Inc. (1750)
Plastics Division
Canton 2, Ohio

Don't Forget to See Plant 2005 A. D. Booths 1401 - 1402

The Philip Carey Mfg. Co. (1515)
Cincinnati 15, Ohio

Exhibit: Industrial insulations; insulating panels; built-up roofing; weatherproofing materials; insulating cements; roof coatings; asbestos-cement boards and sheathings

At the booth: C. M. Brasher; J. D. Cummins; R. W. Davis; O. G. Diamond; J. F. Donegan; F. J. Donohue; J. W. Koenig; H. K. Marcy; G. H. Milner; C. E. Morgan; W. B. Ott; R. C. Paul; P. J. Richards; J. A. Rousmaniere; E. S. Walls

Carpenter Manufacturing Co. (810)
Boston 45, Mass.

Chisholm-Moore Hoist Div. (1042, 1044)
Columbus McKinnon Chain Corp.
Tonawanda, N. Y.

Exhibit: Hand chain hoists, pullers, electric hoists, trolleys, sling chains, hammerlock links.

At the booth: E. J. Byrne; W. J. Koch; Jack Wilson; B. Grimes; B. Lindberg

Clark, Cutler & McDermott (1630)
Franklin, Mass.

Clark Door Co., Inc. (1231)
Newark 8, N. J.

Exhibit: Automatic electric doors

At the booth: Henry B. Clark; H. B. Clark, Jr.; James H. Harris, Jr.

Clark Equipment Co. (1306, 1312, 1405, 1409)
Industrial Truck Division
Battle Creek, Mich.

Clarke Sanding Machine Co .(1545)
Muskegon, Mich.

Exhibit: Electric floor scrubbing-polishing machines, industrial portable wet-dry vacuum cleaners

At the booth: H. L. Potter; Hal Croskey; A. D. Hall

Clementine Ltd. (105)
San Francisco 24, Calif.

The Cleveland Worm & Gear Co. (523, 524)
Cleveland 4, Ohio

Exhibit: Speed reducers, worms and gears, vertical drives for mixing tanks and agitators, and variable speed drives

At the booth: L. O. Witzenburg; W. M. Stilwell; T. B. Ryan; S. G. Lugar; J. P. Murray; G. L. Engelbret; L. B. Abrams; H. H. Platek.

Clipper Manufacturing Co. (419)
Kansas City 8, Mo.

Exhibit: Masonry saws, concrete saws, abrasive and diamond blades for firebrick cutting and plant maintenance

At the booth: Harold Wright; Nick Coates; Roy Bryan; Bill Todd

The Colson Corp. (1413, 1417)
Elyria, Ohio

Exhibit: Casters, wheels, materials handling equipment and hydraulic lifting equipment

At the booth: S. Dickie; R. Bruins; J. M. Spooner; W. C. Shea; D. F. Adams; F. W. Sterrett; R. H. Mullen; W. J. Gold; J. W. Stanley

Commercial Filters Corp. (1464)
Melrose 76, Mass.

Exhibit: Fulflo Filters for industrial fluids

At the booth: J. R. Chisholm; J. V. Calhoun; Gene Stanley; R. P. Findlow; Robert Schadler

Complete-Reading Electric Co., Inc. (1544)
Chicago 6, Ill.

Conover-Mast Publications, Inc. (510)
New York 17, N. Y.

Exhibit: Publications: Mill & Factory, Purchasing, Conover-Mast Purchasing Directory

At the booth: E. M. Stanley; Webb Young; R. A. Gagney; G. D. Vosburg; R. C. Burns; Ray Richards; Alex Graam; Hugh Robinson; Austin O'Toole; Ellsworth Brown; R. T. Roney; Frank Vanderhoff

Cordley & Hayes (1006)
New York 16, N. Y.

Exhibit: Industrial electric water coolers

At the booth: L. D. Toulan; W. Eames; P. R. Lynn; F. S. Best; W. J. Mays

Cushman Motor Works, Inc. (1453)
Lincoln, Neb.

Exhibit: Two and three-wheel motor vehicles, gas and electric powered for movement of personnel and equipment, materials, etc.

At the booth: J. H. Carrier; W. J. Mitchell; Atlee Stephan, Jr.; Frank McDonough

Dake Corp. (1138)
Grand Haven, Mich.

Davey Compressor Co. (1015)
Kent, Ohio

The Dayton Rubber Co. (821)
Dayton, Ohio

Dayton Safety Ladder Co. (1730)
Cincinnati, Ohio

Delpark Corp. (1244)
Lebanon, Ind.

Detroit Steel Products Co. (1229)
Detroit 11, Mich.

DeWalt Inc. (1205)
Lancaster, Pa.

Exhibit: Exhibition and "live" demonstration of radial arm type woodworking machinery

At the booth: John Stolarz; Truman Jones; Charles Snyder; Marlin Boyer; A. E. Richardson, Jr.

Diamond Expansion Bolt Co., Inc. (1638)
Garwood, N. J.

Henry Disston & Sons, Inc. (310)
Chain Saw Division
Tacony, Philadelphia 35, Pa.

The Diversey Corp. (1468)
Chicago 13, Ill.

Exhibit: Pickup, all-purpose absorbent; Qwik-Sil, oil and grease absorbent

At the booth: C. N. MacRae; K. A. Fisher

Dresser-Ideco Co. (1721)
Dallas 1, Texas

The DuBois Co., Inc. (1430)
Cincinnati, Ohio

The du Mont Corp. (406)
Greenfield, Mass.
Exhibit: Broaches, magnetic gage bases, super high speed ground tool bits
At the booth: John S. du Mont; Clinton W. Berry

E. I. du Pont de Nemours & Co., Inc. (1059, 1068, 1166, 1167, 1168, 1267)
Elastomers Division
Wilmington 98, Del.
Exhibit: How Neoprene and Hypalon chemical rubbers improve product performance

E. I. du Pont de Nemours & Co., Inc. (1061, 1063)
Polychemicals Dept.
Wilmington 98, Del.

Durametallic Corp. (1636)
Kalamazoo, Mich.

Duro-Test Corp. (1268)
North Bergen, N. J.
Exhibit: Incandescent, fluorescent, and mercury vapor lamps
At the booth: C. Heidt; L. Weiss; H. Anderson

Eagle Manufacturing Co. (1107)
Wellsburg, W. Va.

The Eagle-Picher Co. (1225)
Cincinnati 2, Ohio

The Ebco Manufacturing Co. (301)
Columbus 13, Ohio
Exhibit: Oasis water coolers, including the new Hot'n Cold model
At the booth: R. H. Orthoefer; T. W. Giller; T. J. Spence; L. H. Combs

Electric Cord Co. (519)
New York 38, N. Y.
Exhibit: Automatic emergency lighting for interiors, exteriors
At the booth: Caesar J. Briefer; Richard M. Steiner, Harry Schwartz

Electrical Construction and Maintenance (723)
McGraw-Hill Publishing Co., Inc.
New York 36, N. Y.

Electro Dynamic Division of General Dynamics Corporation (1116)
Bayonne, N. J.

Embosograf Corporation of America (1726)
New York 10, N. Y.
Exhibit: Embosograf sign-making equipment
At the booth: E. J. Stack; Walter Koch; George E. Kennedy

Empire Corp. (1734)
Milwaukee 14, Wis.
Exhibit: Carbide tool lapping machine and engine generator sets
At the booth: Donald J. Reeve; George W. Thompson, Jr.; G. F. Egan

Enterprise Paint Manufacturing Co. (1359)
Chicago, Ill.

Equipto Division (1067)
Aurora Equipment Co.
Aurora, Ill.
Exhibit: Steel shelving, shop equipment, drawer units, lockers
At the booth: Paul Streit; Henry Voigt; Tom Voigt; Ralph Heisner; George Voigt

Erie Tool Works (309)
Erie 2, Pa.

Eriez Manufacturing Co. (613)
Erie, Pennsylvania
Exhibit: A number of new models of permanent non-electric magnetic separators
At the booth: Ned Hirt; John Cenci; John Sigafoos; Jos. Kern

Express Roller Division (1560)
Industrial East Company
Clifton, N. J.

Factory Management & Maintenance (703)
McGraw-Hill Publishing Co., Inc.
New York 36, N. Y.

The Fairbanks Co. (404)
New York 3, N. Y.
Exhibit: Valves
At the booth: James J. Langan; William R. Bieretz; Charles Enright; William Rogers; L. M. Nellenger

The Farval Corp. (523, 524)
Cleveland 4, Ohio
Exhibit: Centralized systems of lubrication
At the booth: L. O. Witzenburg; W. M. Stilwell; T. B. Ryan; S. G. Lugar; J. P. Murray; G. L. Engelbret; L. B. Abrams; H. H. Platek

Faultless Caster Corp. (1233)
Evansville, Ind.
Exhibit: Industrial casters, truck locks, featuring new grease sealed casters
At the booth: F. W. Myers; J. Dalton; E. W. Fiske; V. Geren; G. Mittleman; J. Couch; R. Eddy

The Felters Co. (1710, 1712)
Boston 11, Mass.
Exhibit: Unisorb vibration mounts, cut felt parts
At the booth: J. Morrison; C. Sykes; D. Gannon; G. Doughty; A. Mariani; N. Hill; E. Borda

Fence Painter Corp. (1563)
Chicago 9, Ill.
Exhibit: Fence painters, house painters, tow-or painters, striping rollers and enamels
At the booth: J. A. Meinhardt; Walter Thrift

Fenway Machine Co., Inc. (220)
Philadelphia 34, Pa.

T. R. Finn & Co., Inc. (203)

Finnell System, Inc. (1501)
Elkhart, Ind.
Exhibit: Floor maintenance equipment
At the booth: James E. Bates; George Hoyt; Frank Greetham; James W. Linn; Robert M. Bliss; Horace Jones; James J. Monaghan; Kurt Berney

Lubriplate Division (1347)
Fiske Brothers Refining Co.
Newark 5, N. J.
Exhibit: Lubriplate lubricants
At the booth: White; Cusack; Colton; Morrow; Duke

The Flexaust Co. (1626, 1628)
Div. of Callahan Zinc-Lead Co.
New York 17, N. Y.
Exhibit: Flexible hose and accessories
At the booth: R. P. Carrington; S. J. Stanfield; A. Grimm; T. G. May

Flexible Tubing Corp. (1325, 1329)
Guilford, Conn.
Exhibit: A complete line of lightweight, flexible ducting in diameters of 1 inch to 30
At the booth: Fredrick K. Daggett; A. H. Loux; Howard W. James

Flex-O-Tube Div. (1609)
Meridan Corp.
Inkster, Mich.

Flexrock Co. (1625)
Philadelphia, Pa.

Flodar Corp. (1132)
Cleveland 3, Ohio
Exhibit: Hydraulic tube fittings
At the booth: H. J. Enders

Benjamin Foster Co. (219)
Philadelphia 31, Pa.
Exhibit: Fire-resistive mastic coatings

Frommelt Industries (1209)
Dubuque, Iowa

Furnas Electric Co. (1513)
Batavia, Ill.
Exhibit: Electric motor controls
At the booth: W. F. Lisman; J. M. O'Rourke; H. Bruno; C. F. Witschonke; F. Lawrence; M. Saake

Gaines-Collins Co. (1353)
Los Angeles 32, Calif.

The Garland Co. (307)
Cleveland, Ohio

The Garlock Packing Co. (1322)
Palmyra, N. Y.
Exhibit: A line of mechanical packings
At the booth: C. F. Palmer, Jr.; J. B. Sewell; R. N. Bradford, Jr.; R. W. Halpin; Ford Wilders; W. J. Lauter; W. L. Mikell; A. C. Mohn; J. W. Russell; L. B. Snyder

Gates Engineering Co. (1017)
Wilmington, Del.
Exhibit: Gaco neoprene protective coatings and tank linings
At the booth: Gilbert H. Spector; Raymond P. Markloff; George P. Kern, Jr.; Howard Oliver; Harold Cooke; Harry H. Jones; Tom Luff; Hank O'Neil; Ed Mery; Jean Bauer

Geerpres Wringer, Inc. (507)
Muskegon, Mich.

General Electric Co. (1525, 1526, 1528, 1529, 1530, 1533, 1537)
Schenectady, N. Y.
Exhibit: Electrical testing and repair equipment
At the booth: 30 trained sales engineers

General Electric Co. (610)
Medium Induction Motor Dept.
Schenectady, N. Y.

The Glidden Co. (1253, 1255)
Cleveland 2, Ohio

Globe International Detective System (1122)
Philadelphia, Pa.

Globe Paint Co. (610)

Grand Specialties Co. (413)
Chicago 22, Ill.

Graton & Knight Co. (624)
Worcester, Mass.
Exhibit: Industrial leathers, belting, packings, strapping
At the booth: W. E. Duckworth, Jr.; J. L. Parker

Gravely Tractors, Inc. (1027)
Dunbar, W. Va.
Exhibit: Gravely tractor and equipment for ground maintenance
At the booth: John Farren; Charles W. Thorn

Greenlee Tool Co. (1448)
Rockford, Ill.
Exhibit: Time saving tools; power benders, punches, expanders, etc.
At the booth: R. J. Samuelson; G. W. Davis; Bob Stevenson; Robert Rayborn; George Krauss; Ben Halliday; Ed Parson

Grinnell Co., Inc. (1714)
Providence, R. I.

Grip-Strut Division (1232)
The Globe Co., Chicago 9, Ill.

Gulf Oil Corp. (1314)
Pittsburgh 30, Pa.

Hammond Machinery Builders, Inc. (1030)
Kalamazoo, Mich.
Exhibit: Dust collector units and grinders with built-in dust collectors
At the booth: R. H. Aldrich; G. E. Scott; W. J. Fabish

The Hansen Manufacturing Co. (1145)
Cleveland 11, Ohio
Exhibit: Quick-connective fluid line couplings—all types
At the booth: Larry Hansen; J. G. Gifford, J. A. Moody

Harnischfeger Corp. (1356, 1360)
Milwaukee 46, Wis.
Exhibit: Welding equipment, hoists
At the booth: Curtis Meyer; W. R. Stephens

Harris-Barrier, Inc. (929)
Indianapolis 23, Ind.
Exhibit: Parking barriers for parking lots
At the booth: Roger T. Graham; Adeline Graham; L. O. Fogler; Lester Phinney

Haveg Corp. (1047)
Newark 45, Del.

H-B Industries, Inc. (1662)
Oakland 20, Calif.

Heli-Coil Corp. (1505)
Danbury, Conn.
Exhibit: Wire thread inserts

Hild Floor Machine Co. (1622)
Chicago 6, Ill.

Hilti-Rapid Fastening Systems (104)

Homestead Valve Mfg. Co. (1214)
Coraopolis, Pa.

Houdaille-Hershey of Indiana, Inc. (419)
Lebanon, Ind.
Exhibit: Industrial filtration equipment
At the booth: W. S. James; J. E. Pirie; E. O. Wolgast; A. R. VanDeWeghe; Eugene Stanley; H. A. Wilson

E. F. Houghton & Co. (320)
Philadelphia 33, Pa.
Exhibit: New type adapters for V packings, rust preventives, cup packings, etc.
At the booth: J. R. Clendenning; C. R. Schmitt; F. L. Heist; C. G. Rivers; J. N. Smith; A. J. Boyer; J. F. Weber; E. G. Irwin; A. C. Smith; J. E. McLaughlin; D. C. Miner; W. H. Anderson

Phillip V. Hughes and Sons (712)
Philadelphia 43, Pa.

Huntington Laboratories, Inc. (602)
Huntington, Ind.
Exhibit: Cleaners, degreasers, mold releases, waxes, soaps, disinfectants, etc.
At the booth: DeVaughn Clark; Everett Simpson; Jack Schlossberg; Clare Bristol; Jack Haney; Dave Livingstone; Duncan Black

Hydraulic Manufacturing Co. (1631)
Bridgeport 4, Conn.

Ideal Industries, Inc. (1210)
Sycamore, Ill.

The Imperial Brass Mfg. Co. (1613)
Chicago 7, Ill.

Industrial Equipment News (1565)
Thomas Publishing Co.
New York 1, N. Y.

Industrial & Farm Equipment Co. (1444)

Industrial Filtration Co. (1244)
Lebanon, Ind.

Industrial Maintenance & Plant Operation (1627)
Maintenance Publishing Co.
Philadelphia 1, Pa.

Industrial Products Co. (1740)
Philadelphia 33, Pa.
Exhibit: Safety equipment and supplies for plant maintenance
At the booth: E. F. Shipman; R. W. Shipman; R. W. Mounce; R. D. McDonald; H. E. Ley; T. Armstrong; R. F. Carter

Industrial Sweeper Co. (720)
South Bend 23, Ind.

Insto-Gas Corp. (1536)
Detroit, Mich.

International Business Machines Corp. (1217, 1221)
New York 22, N. Y.

International Molded Plastics, Inc. (1164)
Cleveland, Ohio

International Research and Development Corp. (1334, 1338)
Columbus 7, Ohio

Invincible Vacuum Cleaner Mfg. Co. (712)
Dover, Ohio

Johns-Manville Sales Corp. (1562, 1564)
New York 16, N. Y.

Johnson Bronze Co. (1259)
Newcastle, Pa.

The Johnson Corp. (607)
Three Rivers, Mich.

S. C. Johnson & Son, Inc. (1538, 1542)
Racine, Wis.

Josam Manufacturing Co. (1720)
Michigan City, Ind.

Joy Manufacturing Co. (1117)
Pittsburgh, Pa.
Exhibit: Electrical connectors and switches for industrial applications
At the booth: N. B. Zeppenfeld; F. A. Bartosch; R. J. Rederschied; R. N. Schlobohm; J. B. Baird; C. W. Miller; C. E. Thorup

Kalman Floor Co., Inc. (1121)
New York 17, N. Y.
Exhibit: Scale models of equipment moving over an actual Kalman floor. Twelve transparencies show method of installation
At the booth: C. J. Wolfe; J. N. McLellan; T. P. Dolan; W. C. Perry; W. Urquhart; C. Fred Ytterberg

Kelley Machine Division (1261)
The Wiesner-Rapp Co., Inc.
Buffalo, N. Y.
Exhibit: Concrete floor finishing equipment
At the booth: John L. Spencer

Kenco Pump Division (1227)
American Crucible Products Co.
Buffalo, N. Y.

The Kent Company, Inc. (712)
Rome, N. Y.
Exhibit: Floor maintenance equipment
At the booth: Frederick H. Ide; Phil T. Hugues; Joe Hugues

Keystone Lubricating Co. (1506)
Philadelphia 32, Pa.

Walter Kidde & Company, Inc. (304)
Belleville 9, N. J.

Kimberly-Clark Corp. (1140)
Neenah, Wis.

Kollmann Manufacturing Co. (1313)
Erie, Pa.
Exhibit: Sewer and drain cleaning equipment (electric, gasoline or air powered)
At the booth: Karl Kollmann; Eric Gustafson; Eugene Peters; Isabel Mox

Koppers Company, Inc. (1345)
Pittsburgh 19, Pa.

The Korfund Co., Inc. (1102)
Long Island City, N. Y.
Exhibit: Vibration, shock and noise control products for industry
At the booth: S. Rosenzweig; D. Vance; J. Harris; J. Weindling; R. Zuckerman; J. Hammond; L. Perlow; N. Creash

Krylon Inc. (1516)
Norristown, Pa.

L-O-F Glass Fibers Co. (704)
Corrulux Division, Toledo, Ohio

Labelon Tape Co., Inc. (1032)
Rochester 9, N. Y.
Exhibit: Pressure-sensitive tapes for labeling and identification of plant and maintenance equipment
At the booth: Deleslie Allen; John L. Sullivan

Laduby Company, Inc. (1022)
Branford, Conn.

Lamson Corp. (604)
Billmyre Blower Division, Syracuse 1, N. Y.
Exhibit: Lamson Billmyre cast iron and fabricated blowers
At the booth: P. E. Hickey; R. Stephens; R. Lanternier; R. Johnson; A. G. Mutimer; R. C. Flood; R. Innes

Lamson Mobilift Corp. (1364, 1463)
Syracuse, N. Y.

Larsen Products Corp. (707)
Bethesda 14, Md.

Water G. Legge Co., Inc. (1130)
New York 17, N. Y.
Exhibit: Safety floor maintenance materials, floor cleaners, polishes, conductive floor coatings and anti-slip floor coatings
At the booth: L. I. Reinhard; E. W. Merritt; S. K. Van Reed

Leslie Co. (514)
Lyndhurst, N. J.

Lift-A-Loft Co. (1658, 1660)
Muncie, Ind.

Lincoln Engineering Co. (1426)
St. Louis 20, Mo.
Exhibit: New Multi-Luber power lubrication systems

Lincoln-Schlueter Floor Machinery Co. (1508, 1510)
Chicago, Ill.

Logansport Machine Co., Inc. (1464)

The Lug-All Co. (1618)
Wynnewood 9, Pa.

Macwhyte Co. (1621)
Kenosha, Wis.
Exhibit: Braided wire rope slings, crane ropes, cable assemblies, and other wire rope products
At the booth: E. F. Garris; Forest J. Nelson; John W. Taylor; Francis D. Holden

Magnaflux Corp. (506)
Chicago 31, Ill

Maintenance Magazine (724)
Cleworth Publishing Co., Greenwich, Conn.

Malsbary Manufacturing Co. (520)
Oakland 3, Calif.
Exhibit: Model 60 Malsbary steam cleaner, Model 250 Malsbary steam cleaner
At the booth: M. K. Dugena; F. A. Rueter; H. S. Nicholson; Charles Nicholson

Manheim Mfg. & Belting Co. (1151)
Manheim, Pa.

Manning, Maxwell & Moore, Inc. (1318)
Muskegon, Mich.

Martin Engineering Co. (1045)
Neponset, Ill.
Exhibit: Full line of silent pneumatic and steam vibrators

Martindale Electric Co. (1605)
Lakewood, Cleveland 7, Ohio

The Master Builders Co. (1550)
Cleveland 3, Ohio
Exhibit: Non-shrink grouting and concrete repairs; iron-clad, heavy duty industrial floors; and other technical treatments for concrete and masonry
At the booth: R. G. Crimm, Sr.; L. H. King; A. P. Seyler; D. C. Dressler; L. F. Stanzel; R. R. Zaremba; W. T. Kennedy

McGill Manufacturing Co., Inc. (1021)
Valparaiso, Ind.
Exhibit: Electrical specialties, including switches, sockets, portable lamp guards, lamp changers, etc.
At the booth: Walter E. Brownell; Darwin C. Whitesell; George C. Knott, Jr.; Albert C. Schultz

Metalock Repair Service (1762, 1764)
Long Island City 1, N. Y.

Mighty Mover Co. (1717)
Denver, Colo.

The Miller Co. (701)
Meriden, Conn.
Exhibit: Fluorescent and incandescent lighting fixtures
At the booth: L. M. Grawemeyer; R. E. Owen; G. W. Beals; F. A. Stewart; P. R. Steele; P. H. Stanley

Milwaukee Electric Tool Corp. (1706)
Milwaukee 8, Wis.

Mine Safety Appliances Co. (921)
Pittsburgh 8, Pa.

Minneapolis-Honeywell Regulator Co. (1256)
Minneapolis 8, Minn.

Mobile Industrial Equipment Corp. (1759, 1761, 1763)
Philadelphia 40, Pa.

Modern Power Sweeper Co. (504)
Azusa, Calif.
Exhibit: Modern Power Sweepers
At the booth: F. J. Machovec; E. J. Henk; D. O. Coir

Modern Sanitation (401)
Powell Magazines, Inc., New York 1, N. Y.

Moffatt Bearings Co. (1708)
Philadelphia 30, Pa.

P. O. Moore, Inc. (1667)
New York 10, N. Y.

Motorola Corp. (1534)
Communications Division, Chicago 51, Ill.

Multi-Clean Products, Inc. (1247)
St. Paul 1, Minn.
Exhibit: Floor maintenance equipment, including floor machines, industrial wet or dry vacuums, portable explosion-proof equipment, and floor maintenance materials
At the booth: E. C. Hesli; Harrold Williams

National Dryer Sales Corp. (1753)
Chicago 6, Ill.

National Industrial Service Association, Inc. (1722)
St. Louis 1, Mo.

New Hermes Engraving Machine Corp. (1106)
New York 3, N. Y.

Oakite Products, Inc. (1512, 1514)
New York 6, N. Y.
Exhibit: Complete line of rust preventives and removers, paint stripping compounds, cleaning and sanitizing materials and equipment, Hurriclean Gun
At the booth: E. F. Connolly; C. S. Anderson; W. M. Bliss; W. G. Boseuf; W. Beckhardt; B. F. Fay; H. Frohwitter; J. M. Hite; H. P. Jacques; J. A. Seybold; J. S. Todd; R. C. Williams; E. D. Hallett; F. A. Rowley; F. C. Tatum

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O'Brien Manufacturing Co. (1062)
Chicago 30, Ill.

The Ohio Carbon Co. (1633)
Cleveland 11, Ohio
Exhibit: Brushes for electrical rotating equipment, special Ohio Karak carbons for electrical and mechanical operations
At the booth: D. Moulton; F. C. Aurand; H. A. Hurlbut; J. F. Ehlers

Ohio Hoist & Mfg. Co., Inc. (1718)
Cleveland 5, Ohio
Exhibit: Ohiolite light weight hoists
At the booth: C. H. Nixon; E. R. Kramer; Jim Brown; Ray Tucker; Len Ipp; L. Delaney; J. B. Williams; J. L. Baker; Alan Graham; James W. Dickey

The Okonite Co. (1010, 1012, 1014, 1016)
Passaic, N. J.

The Oster Manufacturing Co. (1305, 1307)
Cleveland, Ohio
Exhibit: Pipe and bolt threading machines, portable hand lifts
At the booth: R. C. Baumgartner; L. S. Newman; Geo. A. Youngs; J. C. Dangler; Allan Mackenzie

Owens-Corning Fiberglas Corp. (403)
Toledo, Ohio

Packard Water Conditioners Div. (303)

G. H. Packwood Mfg. Co. (1404)
St. Louis 10, Mo.
Exhibit: Industrial skin cleansers, dispensers, and industrial cleaning compounds
At the booth: Noah Thomas

Pantex Manufacturing Corp. (709)
Pawtucket, R. I.
Exhibit: Speedylectric steam jet cleaner, super heater for steam spray painting, Speedylectric steam generator
At the booth: Robert S. Swain; F. J. Riker; B. A. Porter; C. W. Pilling

The Patent Scaffolding Co., Inc. (1521)
Long Island City 1, N. Y.
Exhibit: Aluminum rolling and ladder scaffolds, steel scaffolds, aluminum and wood ladders
At the booth: George Stanton; E. J. Beinecke, Jr.; E. J. Madera

Patterson-Kelley Co. (209)

The Penton Publishing Co. (920)
Cleveland 13, Ohio
Exhibit: Publications: Automation, Foundry, Machine Design, New Equipment Digest, Steel
At the booth: F. O. Rice; D. C. Kiefer; Rand Ebersole; A. N. Gregg; Irwin Such; Edward Lawson

Philadelphia & Suburban Tire Service (1756)

Philadelphia Toro Co. (1654, 1656)
Philadelphia 41, Pa.

Phillips Drill Co. (1725)
Michigan City, Ind.
Exhibit: Phillips self-drilling shields used in concrete
At the booth: J. Warnimont; L. Campbell; J. Wagner

Richard Phillips & Assoc., Inc. (1741)
Baltimore 2, Md.

Pittsburgh Coke & Chemical Co. (1158, 1160)
Pittsburgh 19, Pa.

Pittsburgh Corning Corp. (1037, 1041)
Pittsburgh 22, Pa.
Exhibit: PC glass blocks for new construction and window modernization and Foamglas insulation for piping, tanks and other equipment for building insulation
At the booth: R. E. Buckley; R. E. Fuhs; J. A. Vasey; J. H. Price, Jr.; R. G. McNamara

Plant Engineering (1401, 1402)
Chicago 3, Ill.
Exhibit: The plant of 2005 A.D.
At the booth: E. C. Prouty, Sr.; R. H. Morris; Thomas E. Hanson; R. L. Marinello; E. B. Skubik; R. Mitchell; R. Hagenmiller

Ponsell Floor Machine Co. (1333)
New York, N. Y.

Portomag Sales, Inc. (309)
Ferndale 20, Mich.

Powder Power Tool Corp. (1616)
Portland, Ore.

Proctor & Schwartz, Inc. (1632, 1634)
Philadelphia 20, Pa.

The Protectoseal Co. (1105)
Chicago 8, Ill.

Punch-Lok Co. (1125, 1127)
Chicago 7, Ill.
Exhibit: Hose clamps for pneumatic, sandblast, welding, LPG, railway air-brake and air-signal hose, duct connections, etc.
At the booth: R. E. Tatham; M. J. Fenelon; A. Grossmann; W. C. Wiley; J. P. Prible

Quaker Maintenance Co., Inc. (1644)
Wallmaster Division, New York 11, N. Y.
Exhibit: Wall washing demonstration using Wallmaster machine

At the booth: H. A. Klein; A. A. Kahan; L. Forman; J. L. Horgan

Radio Corp. of America (1747, 1751)
RCA Victor Division, Camden, N. J.

Ramset Fasteners, Inc. (1134)
Ramset Div., Olin Mathieson Chemical Corp., Cleveland 11, Ohio

Rapids-Standard Co., Inc. (1709, 1711)
Grand Rapids, Mich.

Raybestos-Manhattan, Inc. (503)
Packing Division, Passaic, N. J.
Exhibit: R/M Big 7 Packings
At the booth: R. B. Hazard; G. E. Horvath; J. McKinlay; B. W. Thomas

Reed Manufacturing Co. (409)
Erie, Pa.

Remington Rand, Inc. (1348, 1352)
Div. of Sperry Rand Corp., New York 10, N. Y.
Exhibit: Maintenance control systems and procedures, inventory control systems for maintenance parts and supplies, staff scheduling systems, tool crib control, commodity classification systems
At the booth: Al Radin; George Bastianello; Blake Friscia; I. Harvey

J. C. Renfroe & Sons, Inc. (1460)
Jacksonville 1, Fla.

Remember AIPE Luncheon
January 24th
Tickets at AIPE Booth

Resolite Corp. (1136)
Zelienople, Pa.
Exhibit: Reinforced fiber glass panels for industrial skylighting, glazing partitions
At the booth: Harold N. Davis; Emily T. Calhoun; Steve Stefanski; Linn Brown; Bernard Magette

J. E. Rhoads & Sons (822)
Wilmington 99, Del.
Exhibit: Industrial leather belting and packing
At the booth: Samuel L. Allen; Harry H. Conrad; James D. Conrad; Daniel C. Frysinger; Warren F. Decker; James H. Millar; Richard H. Rhoads; Carl H. Tildes

Richmond Foundry & Mfg. Co. (601)
Richmond, Va.

The Ridge Tool Co. (1406, 1410)
Elyria, Ohio

L. M. Robbins Co. (1653)
Haddonfield, N. J.

H. H. Robertson Co. (1334, 1338)
Pittsburgh 22, Pa.

Rocket Devices Corp. (1612)
New York 8, N. Y.

Rohm & Haas Co. (1206)
Philadelphia 5, Pa.
Exhibit: Maintenance uses for transparent Plexiglas, acrylic plastic, flat and formed sheet, including window glazing, safety shields, lighting fixtures, dome skylights and transparent tanks and machine windows
At the booth: R. R. Rorke; H. A. Williams; A. R. McFarland; C. S. Wetzel; W. T. Reedy; F. E. Welte; S. J. Werenski

Rome Cable Corp. (1559)
Rome, N. Y.
Exhibit: Rubber and thermoplastic insulated wires and cables
At the booth: David Smith; Lewis Selden; Mark Wolf; Dwight Thayer

Roseman Mower Corp. (1617)
Evanston, Ill.

The Barney Roth Co., Inc. (1659)
Philadelphia 7, Pa.

Royal Metal Manufacturing Co. (1567)
Chicago 1, Ill.
Exhibit: Industrial seating equipment and furniture for lounges, reception rooms and cafeterias
At the booth: Ben Berney; Frank O'Conner; Harold Rowland; Kurt Rosenbaum; Paul Argyelan

Rust-Oleum Corp. (1150)
Evanston, Ill.
Exhibit: Rust preventive products
At the booth: T. S. Walsh; W. A. Bellows; Robert J. Zobel; Wm. F. Douglas; Joe B. Harris; Walter Zamerovsky

Safway Steel Products, Inc. (1416)
Milwaukee, Wis.

Sarco Company, Inc. (1302)
New York 1, N. Y.
Exhibit: Sarco thermodynamic steam traps
At the booth: A. Milnes; M. J. Marion; O. Roland; J. M. Thompson; D. Mariner

A. Schrader's Son Div. (1248)
Scoville Manufacturing Co., Inc.
Brooklyn 38, N. Y.
Exhibit: Hydraulic fittings
At the booth: F. H. Churchwell; J. Meister; E. J. Schan; L. R. Doty; F. L. Engstrom; S. LeCount

Scott Paper Co. (317, 319)
Chester, Pa.
Exhibit: Scott industrial paper wiper, industrial towel and service roll
At the booth: J. George Breitling; Allan Q. Johnston; John G. Gibson; E. Brooke Lee; H. Earle Wilgus; Leonard A. Borkland; David J. Scott; Burt B. Roens; J. J. White; P. J. Rothwell; M. Figgatt; J. B. Richey

Sellers Injector Corp. (502)
Philadelphia 30, Pa.
Exhibit: Sellers hydraulic jet cleaners for cleaning inside of tanks, tank cars and tank trucks; also Haines steam traps
At the booth: Victor F. Sheronas; I. P. Pedrick; P. E. Raymond; Coleman Sellers III; William Sellers; R. A. Reitz

Shell Oil Co. (224, 323)
New York 20, N. Y.

Silent Glow Oil Burner Corp. (410)

Siliphane Corp. of America (1258)
New York, N. Y.

Simoniz Co. (1115)
Chicago 16, Ill.
Exhibit: Floor maintenance products
At the booth: H. C. Rains; J. O. Keane, Jr.

Simplex Wire & Cable Co. (1111, 1113)
Cambridge 39, Mass.

Skil Corp. (1230)
Chicago 30, Ill.

A. O. Smith Corp. (1357, 1664)
Milwaukee, Wis.

Smith of Philadelphia (517)
Philadelphia 7, Pa.

Snap-On Tools Corp. (210)
Kenosha, Wis.

Snap-Tite, Inc. (1038)
Union City, Pa.
Exhibit: Quick connect-disconnect couplings for hydraulic, pneumatic and fluid transfer
At the booth: Tom Welsh; Leonard Clark

Socony Mobil Oil Co., Inc. (1344)
New York 4, N. Y.

The Spee-Flo Co. (1159)
Houston 4, Texas

Speedi-Dri Corp. (509)
Menlo Park, N. J.
Exhibit: Sol-Speedi-Dri, all purpose oil, water and grease absorbent
At the booth: R. A. Hogan; L. M. Mank; R. J. Shaner; P. B. Lees; F. W. Eib; D. M. Lyon

The Spencer Turbine Co. (501)
Hartford 6, Conn.
Exhibit: Portable and stationary vacuum cleaners, also a small pneumatic conveyor system
At the booth: Norm S. Barnes; R. A. Brackett; A. B. Bates; Sam Douglass; R. Graff; R. Webber; I. H. Geiger; R. A. Brackett, Jr.

Sperry Products, Inc. (1648, 1650)
Danbury, Conn.

Spider Staging Sales Co. (1144)
W. Conshohocken, Pa.

Spray Starting Fluid Co. (1645)
Camden 1, N. J.

Stackbin Corp. (1011)
Pawtucket, R. I.

Standard Dry Wall Products, Inc. (1163)
New Eagle, Pa.

Standard Pressed Steel Co. (1459)
Jenkintown, Pa.
Exhibit: Steel shelving, cabinets and storage walls for plants, shops and offices.
At the booth: George C. Somes; Crawford P. Moxson; Robert Slater; William Madden, Jr.; Raymond Pretsch; Harry L. Smith; Wallis B. Allen; Leonard H. Clark; Irad Lackey

Standard Safety Equipment Co. (1152)
Newark, N. J.
Exhibit: Welding curtains, blankets and taps
At the booth: John N. DeRoulet; Robert C. Stouffer

Stanley Electric Tool Div. (1263)
The Stanley Works, New Britain, Conn.

The Stanley Works (1264)
Magic Door Division, New Britain, Conn.

Star Expansion Bolt Co., Inc. (1610)
New York 6, N. Y.

Steiner Sales Co. (1005)
Chicago, Ill.

Stelcon Industrial Floors, Inc. (1727, 1729)
New York 6, N. Y.

Stockwell Rubber Co. (1325, 1329)
Philadelphia 25, Pa.

Stokvis Edera & Co., Inc. (1456)
New York 16, N. Y.

Stratoflex, Inc. (313)
Fort Worth, Texas

Sugar Beet Products Co. (1414)
Saginaw, Mich.
Exhibit: Powdered industrial skin cleansers, waterless skin cleanser, cream deodorant soap, and dispensing equipment, and cleaner-sanitizer

At the booth: Lawren E. Lee; T. J. O'Brien; B. B. Baulch; Ed Clark

Sunroc Corp. (1667)
Glen Riddle, Pa.

Swivelier Co., Inc. (1647)
Brooklyn, N. Y.

Sylvania Electric Products, Inc. (1606, 1608)
New York 18, N. Y.

The Tapecoat Co. (1118)
Evanston, Ill.
Exhibit: Coal tar and asphalt protective coating for pipe, pipe fittings, insulated pipe, conduit, cable and tie rods
At the booth: J. R. Wall; J. F. Walsh

Templeton, Kenly & Co. (513)
Broadview, Ill.
Exhibit: Simplex mechanical and hydraulic jacks and centerhole portable hydraulic pullers
At the booth: J. B. Templeton; P. H. McManus; E. A. Zimmerman; G. R. Weed

G. H. Tennant Co. (1518, 1522)
Minneapolis 11, Minn.
Exhibit: New floor maintenance machines
At the booth: O. C. Hognander; G. D. Billings; R. L. Lindboe; J. H. Kelley; R. C. Crickmer; J. F. Thorsen; P. A. Manfra; R. T. Gault; A. H. Jackson; R. H. Trost; J. P. Ryan

The Thomas & Betts Co., Inc. (1009)
Elizabeth, N. J.

Thomas Flexible Coupling Co. (1548)
Warren, Pa.

Thomas Publishing Co. (1565)
New York 1, N. Y.
Exhibit: Publications: Thomas Register, Industrial Equipment News
At the booth: F. Morse Smith; W. E. Irish; Gene Bover; David Guval

The Thompson Electric Co. (1128)
Cleveland 14, Ohio

Thor Power Tool Co. (1026)
Aurora, Ill.
Exhibit: Portable air and electric tools
At the booth: M. A. Sorenson; Joseph Wity; W. J. McGraw; John MacDonald; J. P. Stine

Titeflex, Inc. (1260)
Newark 5, N. J.

The Toledo Pipe Threading Machine Co. (1445)
Toledo 4, Ohio

The Tool Steel Gear and Pinion Co. (1661, 1663)
Cincinnati 16, Ohio

Torit Manufacturing Co. (1207)
St. Paul, Minn.
Exhibit: Torit dust collectors
At the booth: Stanley Pollnow; Jay Achenbach; Arnold Landres; Art Bennet

Trabon Engineering Corp. (1211)
Cleveland 3, Ohio

The Tremco Manufacturing Co. (1201)
Cleveland, Ohio
Exhibit: Products for building construction and maintenance: Roofing, flooring, caulking and glazing, paints, waterproofings
At the booth: C. B. Bernauer; S. J. Sedler; J. H. Ricketts; R. L. Willenborg

Truscon Laboratories (1568)
Detroit 11, Mich.

Turco Products, Inc. (1547)
Los Angeles 1, Cal.

Union Wire Rope Corp. (1147)
Kansas City 26, Mo.
Exhibit: Wire rope and Tuffy slings
At the booth: R. B. Boand; D. E. Bedford; D. B. Dugan; R. K. Cooke; L. A. Price; R. G. Noble

Unistrut Products Co. (1432)
Chicago 7, Ill.
Exhibit: Adjustable metal framing and mechanical supports including channel, fittings, concrete inserts, roller supports, pipe damps, pipe hangers, brackets, racks and shelving.
At the booth: Edwin A. Nickel; F. W. Ingraham; C. Elsasser, Jr.; G. A. Hagopian

United Specialty Corp. (416)
El Dorado, Ark.

U. S. Electrical Motors, Inc. (1033, 1035)
Los Angeles 54, Cal.
Exhibit: Electrical motors for industrial use, standard horizontal and vertical motors, totally enclosed and explosion proof motors, gearmotors and variable speed motors
At the booth: W. M. Johnson; J. F. Devine; R. M. Cusato; R. A. Silhol; M. J. Glavin; R. B. Lehman; N. E. Thieme

United States Gypsum Co. (1156)
Chicago 6, Ill.

Up-Right Scaffolds (1226)
Div. Up-Right, Inc., Berkeley, Cal.

Vacu-Blast Co., Inc. (1716)
Belmont, Cal.

Valdura Maintenance Paint Div. (1008)
American Marietta Co., Chicago 11, Ill.

Veeder-Root, Inc. (1724)
Hartford 2, Conn.
Exhibit: Mechanical and electrical counters for on-the-spot and remote indications for process control or quality control
At the booth: G. L. Logan; T. Nelson; R. E. Walker; D. G. Dresser; R. W. Moller; W. C. Brooks

Velocity Power Tool Co. (1148)
Pittsburgh, Pa.

Vespa Distributing Corp. (1110)
New York 17, N. Y.

Vestal, Inc. (1018)
St. Louis 10, Mo.
Exhibit: Germicidal detergent for floors, antiseptic skin cleaners and protective hand creams
At the booth: C. K. Spencer; Wm. Schneider; Hugh Sweeney

Vibration Mountings, Inc. (1639)
Elmhurst, L. I., N. Y.

Victor Adding Machine Co. (1129, 1131)
Chicago, Ill.

E. H. Wachs Co. (1029)
Chicago 22, Ill.

Wagner Electric Corp. (1236)
St. Louis 14, Mo.
Exhibit: Demonstration of air and hydraulic brakes and actuators; electric motors and transformers
At the booth: L. C. Dobrunz; M. H. Nelson; G. M. Coffey; H. B. Nechemias; R. W. Angert; G. F. DuBois; M. D. Paul; R. E. Bryant; W. F. Howse; L. M. Weltmer

Walworth Co. (1436)
New York 17, N. Y.

Waverly Petroleum Products Co. (1532)
Philadelphia 3, Pa.
Exhibit: Waverly Hi-Dri oil and grease absorbent

Wayne Manufacturing Co. (1452)
Pomona, Cal.
Exhibit: Wayne power sweepers
At the booth: W. W. Kingman; R. Lamken; John F. Fitzgerald

Weatherhead Co. (1034, 1036)
Cleveland, Ohio

West Disinfecting Co. (1502)
Long Island City 1, N. Y.

Western Gear Co. (1456)
Belmont, Calif.

Westinghouse Electric Corp. (614, 616, 620, 713, 717, 719)
East Pittsburgh, Pa.
Exhibit: Motors, control, renewal parts, apparatus repair facilities—Thermalastic, Coilife, Bondite and Silicone windings

Westline Products Div. (1651)
Western Lithograph Co.
Los Angeles 54, Cal.

Wheel Trueing Tool Co. (1028)
Detroit 6, Mich.

The Wilbur & Williams Co. (1467)
Boston 35, Mass.
Exhibit: Industrial paints
At the booth: Merton E. Williams; Thomas Durkee; Ransford W. Furbeck; William Matz; Clarence Vincent; Joseph Keaney; Ellis Bloch; Herbert Grundy

Wilshire Power Sweeper Co. (1615)
Elgin, Ill.
Exhibit: Industrial power sweeping machines
At the booth: L. J. Langeness; S. M. Pond

Wise Engineering Co. (600)
Newark 5, N. J.
Exhibit: Portable and collapsible gantry crane, 4000 lb capacity
At the booth: Andrew J. Smith; Arthur Von Der Linden; Oliver J. Wise

The Witt Cornice Co. (1642)
Cincinnati 14, Ohio
Exhibit: Ash and refuse cans, pails, oily waste cans, push-top lids, roller cans, hoisting cans and dollies
At the booth: R. A. Suddendorf; S. J. Swenson, Jr.; M. Rothschild; Alan Kremer; L. E. Beckman, Jr.

Woodbridge Ornamental Iron Co. (1715)
Chicago 14, Ill.
Exhibit: Spiral stairways
At the booth: J. A. Anderson; R. S. Woodbridge

The Yale & Towne Manufacturing Co. (1216, 1222, 1315, 1321)
New York, N. Y.
Exhibit: Materials handling equipment including industrial lift trucks and hoists
At the booth: P. R. Minich; J. J. Murray; R. H. Marsh; T. F. Moriarty; G. A. Vining; N. C. Baker; J. H. Brown; C. O. Hedner

The Yale & Towne Manufacturing Co. (1054, 1056, 1153, 1155)
Hoist Division
Philadelphia 15, Pa.

Yarnall-Waring Co. (1048, 1050)
Philadelphia, Pa.

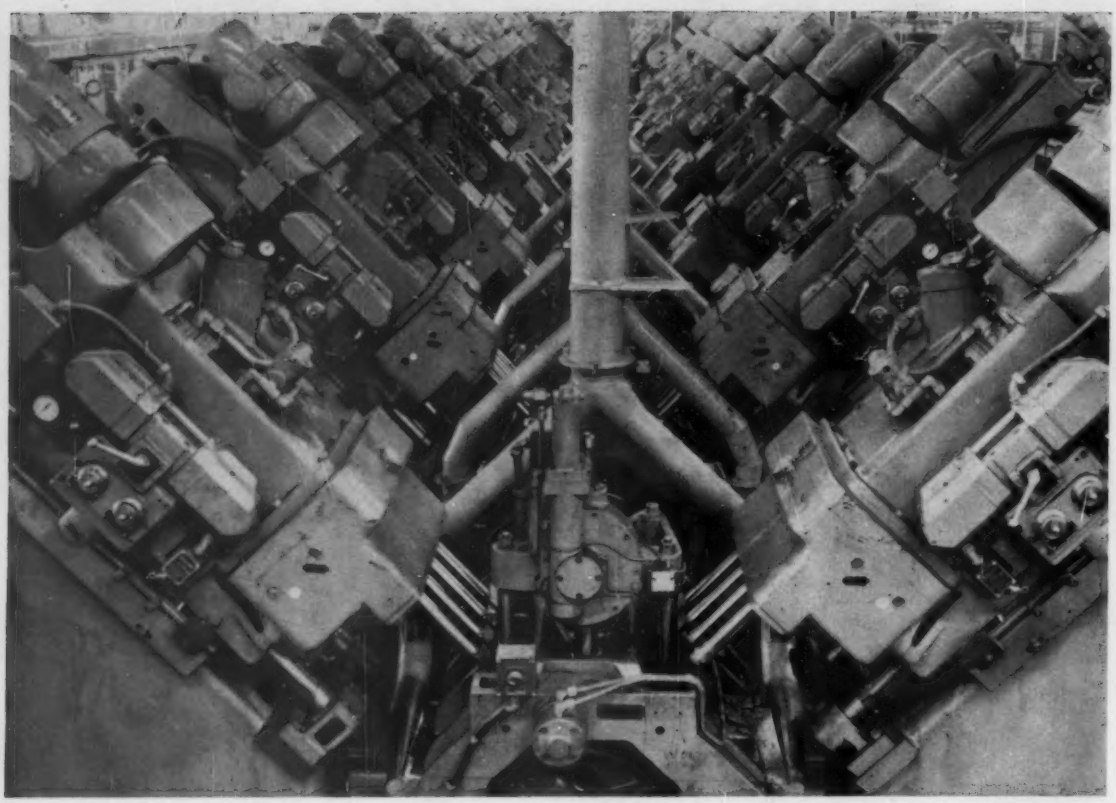


Fig. 1. Drilling, chamfering, and finish reaming are done automatically by this 17-station machine at a Ford engine plant

What Happens to Maintenance—

Now That Automation is Here to Stay?

The interpretation of Automation varies . . . Whether it is new is also a moot question . . . Regardless, it is changing maintenance procedures and thinking . . . This is indicated by the following collection of opinions

Reduce Maintenance By Good Design

"The field of maintenance is caught in the current of progress too. As automation increases, the complexity of the controls increases. Then, it would seem to follow, that maintenance would increase in quantity and quality. And that is the case, unless serious thought at the design stage is given. There are various ways in which the problem of maintenance can be aided. The detection and location of trouble can be minimized by new developments, such as our Electro-Graphic Detector. Maintenance can be moved from the machine to the workbench by using plug-in equipment. Proper location and engineering can make equipment easier to maintain. This is just a partial list; but, in the final analysis, unless the electrical equipment is thrown away, maintenance is still required.

"With proper engineering, proper equipment, and the use of detecting aids, the primary maintenance can be done by relatively inexperienced or unskilled personnel. That which cannot be done by this class of men can quickly be replaced and thrown away, or taken to the repair shop for higher echelon maintenance.

"At this point, the required skill will be increased; and as more technical equipment is used, the technical knowledge and skill of the maintenance personnel at the final stage will increase."[1]

"Management must immediately realize that extensive training of their maintenance personnel and operators must be undertaken if the machines of this era and the future are to produce at an 'Automation' rate. Unions must also realize that they can do their part by urging their members to do outside studying and to attend company sponsored classes."[2]

"The service man must be able to understand electro-hydraulic networks that had puzzled the designers themselves. It seems obvious that the know-how of control builders must be passed along to the maintenance man. We must train the personnel who are to maintain these machines, or forget the very idea of automation."[3]

1. M. C. Cridlebaugh
2. R. C. Schlehuber
3. Robert Skibbe
W. F. and John Barnes Co.

Automation Will Call for Very Strict P-M Programs

"In thinking of automation in terms of its meaning to our company, it would seem that the need for the present maintenance skills will still be required. However, I can see the need for further skills such as electronic and control mechanics.

"Automation will no doubt decrease the need for so called machine operators but will increase the need for skilled tradesmen. Automation will demand very

stringent preventive maintenance programs and will change the supervisor's job to one of planning for maintenance rather than one of knowing what to do after the breakdown. The supervisor will need more skill in handling of people as maintenance work becomes less and less of repairing breakdown and more and more of doing preventive work."

Daniel R. Long
Staff Engineer
Can Division
Crown Cork & Seal Co., Inc.

Maintenance Management Must be Stringent

"Maintenance management must be held very tight. Personnel must be trained. New job classifications may be necessary in the maintenance crews. More specialists will be required and either hired or present personnel trained. The maintenance department must remember that if a machine is down more production would be lost than before automation.

"I firmly believe that with effective planning and efficient control, the problem of automation on maintenance personnel and operations will be small."

Sidney Danoff
Plant Engineer
Midland Industrial Finishes Co.

Curative and Preventive Classes of Maintenance

"Most likely there will be two maintenance men to replace the one common today. One of these will be a utility man familiar with systems and complete setups and the other will be a specialist for detailed maintenance. These workers will most likely fall into two classes—'preventative' maintenance and 'curative' maintenance.

"The 'preventative' maintenance man will be one who can recognize approaching trouble and who will run system checks to determine whether or not the system is approaching a breakdown. This person will be trained in recognizing trouble in the machine (which is an integral part of the complete system) such as mechanical wear in various parts, slippage, stickiness, and any other malfunctions which may cause difficulty.

"He will also have at his command meters and instruments for checking the control circuits. It is expected that check points, patterns, and various fixtures will be placed at his disposal to help him locate possible weak points in the system. In this way he can determine whether or not a particular portion of the machine or control is beginning to deteriorate. The difficulty can then be located and removed before an actual failure occurs.

"Because components sometimes tailor themselves to a particular circuit an individual component check is not necessarily indicative of the proper functioning of that component. Consequently, it is felt that control check points with definite operating limits will serve his purpose better than individual component checks.

"This maintenance man also will acquire the job to maintain records showing the adjustments and conditions peculiar to a particular application. His records will indicate what part of the system is weak and requires special attention and will indicate the need for spare parts and regularly scheduled work to prevent a shutdown.

"The maintenance man referred to above will be well versed in operations of systems instead of individual parts, but it will still be necessary to have machine and control specialists.

"These people will be effective in the 'curative' maintenance group to correct the detailed difficulties after the trouble area is located. They will be skilled in the intricacies of the particular control or machine and service it directly on the floor; or, if spare units and assemblies are available, the troubled area can be removed and corrected in the shop while the new assembly can be placed in the machine to keep it running.

"It may be possible that these two men will be rolled into one but it is believed that it will be found that within the next few years sectionalized control will enable the 'preventative' maintenance man to remove a faulty section and replace with a spare unit, and the 'curative' maintenance man will then correct the faulty section.

"From the above it is seen that the future maintenance man will be required to have a more technical background. It will be a few years before this man can develop and until that time elapses, it is probable that the machine user will require a considerable amount of help from the machine or control manufacturer."

D. B. Schneider
Specialty Control Dept.
Engineering Section
General Electric Co.

Supervisory Personnel Has To Know New Equipment

"A chemical process industry, such as ours, with its round-the-clock operation, substantial capital investments, and ambition to always produce better material at a lower cost to the customer, has been active over the years in the application of automatic equipment.

"Some of our earlier attempts to incorporate electronic elements of automation to speed control in comparison to electrical and mechanical methods were not too successful. Equipment manufacturers had not built into their tubes, relays, and coils the elements of endurance to meet our round-the-clock continuous operation. Also, we found that we had to develop and train a new standard of area mechanics.

"As the years have passed, our installations of automatic mechanical, hydraulic, electrical, and electronic devices have increased and brought about changes in our maintenance organization. The effects of 'automation' on our maintenance organization, supervision, and personnel are:

"1. Organizationally it has placed maintenance supervision on a par with production supervision.

"2. The percentage of maintenance mechanics in ratio to production employees has increased.

"3. The maintenance department has assumed an active part in scheduling of production and repair programs so as to facilitate maximum equipment usage.

"4. A higher type of maintenance mechanic has had to be developed. This has been accomplished by study of manufacturers' instructions, special training programs in the plant, and the use of training programs offered by equipment manufacturers.

"5. Maintenance supervisory personnel has had to make a thorough investigation of new equipment. Equipment procedures, charts, diagrams, etc., have had to be studied in preparation for directing repair procedures as necessary.

"6. 'Operator gadgeting' has been reduced. Because of the complexity of equipment and lack of skill, operators are more inclined to adopt a 'hands off and wait policy' and call the mechanic. This attitude has been beneficial in not adding to the trouble.

Fig. 2. Panel can handle on-off switching for as many as 40 remote operations

"7. The aggressive manufacturer who issues detailed instructions, erection diagrams, drawings, and repair procedures has gained the respect and confidence of both supervision and mechanics.

"Through automation, a higher ratio of capital investment to production employee has resulted in higher fixed costs for all periods of down time. This has changed the concept of the maintenance group from just being an item of necessary overhead to an active and cooperative unit of production.

"The days of the hammer and wrench maintenance organization that went into action when something broke down are on the way out. It is being replaced by a maintenance organization with an analytical view toward maintenance requirements, skilled and specially trained mechanics, adequate equipment, and a goal to work with the production department to give the customer what he wants, when he wants it, and at a price he is willing to pay."

K. N. Banthin
C. & M. Supervisor
The Visking Corporation

Maintenance Worker Will Replace Production Worker

"Automation is having a profound effect on the maintenance worker. Every time a labor saving device is purchased for the maintenance worker he is being subjected to a form of automation. As a result of these labor saving devices he must increase his skills.

"As these small labor saving devices increase the need for higher skills, so does the large amount of complicated equipment necessary for true automation increase the need for higher skills. These higher skills will be needed in all branches of maintenance from line personnel up to and including staff. Automation will require more men in the instrument and electronic shops, increased Maintenance Engineering staffs, well-planned preventive maintenance will become a must, office personnel will increase, and more formal training for the crafts will be necessary.

"In the overall plant picture the maintenance worker will become a more important part. He will become more directly responsible for plant output, and in some plants he will replace the production worker."

R. C. Cuny
Lederle Laboratories

Controls Must Be in Easily Replaceable Units

"The increasing use of automation is accelerating the development and application of electronic, pneumatic and hydraulic forces. This makes it mandatory for maintenance supervisors to keep abreast of these new developments and provides an opportunity for growth in skills and knowledge for the maintenance force, through on-the-job training.

"The high cost of automation equipment and consequently the large volume of production expected from this equipment means that efficient immediate maintenance service is necessary. This will tend to put the maintenance man into the status of a production operator, and maintenance control systems will have to be revised accordingly.

"Manufacturers of components for automatic controls will have to make these easily replaceable in units and provide a practical factory rebuilt exchange service at a reasonable cost. This is especially necessary for smaller plants where the man-power and talent for rebuilding components is not available."

Fred L. Leason, Jr.
Plant Engineer
Interstate Bakeries Corp.

Maintenance Jobs, Skilled Help Demand Will Increase

"One thing is certain. The days of the 'all around' mechanic as far as machine maintenance is concerned, is definitely out the window. As more machines are subjected to automation we become involved in more hydraulics, pneumatics, electronics, instruments, electrical and mechanical devices all a part of one machine or production train.

"I do not believe that automation will mean fewer jobs in general. In fact, it will mean more maintenance jobs because maintenance like engineering, law, medicine and other professions, is rapidly becoming highly specialized. When a machine is doing operations which formerly required a dozen men to perform, a shutdown may very well mean the difference between profit and loss. Therefore maintenance men cannot be called from some distant point; they must not only *be* there but they must also know *what to do.*

"Progressive companies will send men out to take advantage of free classes in instruction offered by instrument companies and others. A tremendous amount of information can be gained by attending conferences and institutes conducted by universities. Demand for skilled help will constantly increase in my opinion."

Warren M. Clark
Supt. Maint. and Elect. Depts.
Kearney & Trecker Corporation

Automation Will Extend into Various Maintenance Jobs

"The complicated electronic controls on today's automatic machines will require highly skilled men who will constitute a new trade in the Maintenance Department. Such men will have to be developed from the more intelligent electricians already in the department or trained outside and brought in.

"We feel that it may be desirable to send maintenance supervisors or leaders to machine tool manufacturers to study new equipment so that they may be more familiar with its operation and maintenance.

"Certainly preventive maintenance will become more important so that down time will be held to a minimum on costly and highly productive automatic machines.

"We may be sure that the trend toward automation will increasingly extend into such maintenance operations as cleaning, waste disposal, material handling, building repairs and construction."

Warren F. Bower
Plant Engineer
SKF Industries, Inc.

Regular Maintenance Is Machinery's Medicine

"Automation is fundamentally the replacement of man with a machine, or rather the equipping of man with better tools to operate with. You never get away from the man. For example, a motor-operated lift truck helps a man to work more efficiently than he could with his own back and arms. It greatly increases his output. Carrying this principle a little further, we have a two million dollar plant operated by three men.

"In the case of the fork lift truck, the two million dollar plant and numerous other automatic operations, the essential thing is that the machine must be kept in perfect operating condition, as failure of the machine could be disastrous.

"The men you don't see when you watch a high speed production line are the men who groom the machines.

"Each plant and each production line is a separate problem, requiring special treatment. Modern automatic equipment is so costly that you can't afford to have spare equipment, and in many cases, the equipment has to operate twenty-four hours a day, seven days a week. Regular planned maintenance is the medicine which keeps the automatic equipment in operation. The maintenance staff are the doctors and nurses that keep the patient alive. As industry becomes more and more automatic, maintenance becomes more of a problem and the maintenance staff more and more important to the operation of the plant."

E. F. Hanford
Plant Engineer
Lever Brothers Company

Training Program Is Essential to Automation

"The subject is too encompassing and space too limited for a lengthy discussion. I think the three most important factors that are essential for a plant that is in the progress of automizing are:

"1. A well-functioning preventive maintenance program. This is necessary because a breakdown during production usually results in such terrific losses that all possible effort must be made to reduce them to a minimum.

"2. Training program. This is essential since automatic equipment is necessarily more complicated and, therefore, people servicing this equipment must be trained to become thoroughly familiar with it.

"3. The use of J.I.C. standards. This in connection with the preventive maintenance program to do everything humanly possible to prevent breakdowns."

R. G. Zarling
Plant Engineer
American Motors Corp.

More Engineers on Staff; Higher Grade of Mechanics

"Planned preventive maintenance will receive more attention. This phase continues to be the responsibility of the plant engineer. This will involve a tendency towards a larger staff on his part, involving more clerical work. But more important, due to the increasing complexity of the equipment involved, it will mean more engineers on his staff and a much higher grade of mechanics. There is a vast difference between the electrician and machine tool repairman adequate for an ordinary lathe or milling machine and the type of mechanic involved when there is a multiplicity of electronic, hydraulic, pneumatic and mechanical controls."

H. D. Ege
Works Engineer
Aviation Gas Turbine Div.
Westinghouse Electric Corp.

(Continued on page 208)

Fig. 1. Foot-operated jig raises micrometer arms for insertion of wheel; triples inspection rate

Simplify Manufacturing Techniques— Amplify Savings

By A. W. WILKINSON, Engineer
Canadian Carborundum Co., Niagara Falls, Ont.

WITH LABOR and material costs continually rising, a company must be concerned with better and more economical manufacturing techniques to keep up with competition; and because price is becoming a more important factor in sales, these savings must necessarily be made on manufacturing costs, to maintain adequate profit margins.

Since the answer lies in increased productivity, and labor cannot be expected to work harder or faster or longer, engineers can best attack the problem by well-planned capital investments in better plant layouts and additions; better production tools and equipment; better methods; and prevention of waste.

A capable engineer can often put his finger on possibilities where money can be saved without spending a cent, simply by reducing waste. Too many employees in every plant do unnecessary work—too many perform necessary work inefficiently.

Top executives should reach into the lower levels of management, to the man who knows the job being performed, to achieve improvements in equipment and methods; thus engineering is supplemented by imagineering.

A cost-reduction program, embracing this concept of "bottom's-up management," has been in effect in our company for the past year. It encompasses three phases:

1. Expenditure control.
2. Work simplification technique.
3. Monthly supervisor project conferences.

Most supervisors are just as interested in controlling costs as are superintendents and managers. Why not take advantage of this cost consciousness and further it, by keeping them informed of the financial operation of the company?

The explanation of several phases of expenditure control are given to all levels of our management.

We interpret work simplification to mean the systematic search for easier and better ways of doing work. It does not necessarily call for anyone working harder or faster; rather it strives for the elimination of wasted time, money and effort in any type of work, including manual, maintenance, clerical, sales, etc.

Plan Takes Effect

Once our work simplification plan began to take effect, many constructive ideas were offered.

In the finishing department, thickness measurement of abrasive cut-off wheels was time-consuming and monotonous when performed with a hand micrometer. A jig arrangement, designed by supervisors, has tripled the inspection rate of the wheels. See Fig. 1.

The jig is operated by a foot pedal, which, when depressed, raises the micrometer arms, enabling the inspector to insert a cutoff wheel into the jig. Release of the pedal lowers the micrometers to make contact with the wheel, giving three simultaneous readings.

Another job that benefitted from work simplification, was the filling of orders for valve grinding compound. This usually took two to three hours and half of this time was spent in preparation. Oil drums had to be transported 50 ft from storage, uncapped, valves inserted and set up in cradles. Depending on the size of the order, the drums might have to be changed six times in one day. In addition, grain had to be moved a distance of 300 ft from the storage place to the mixing area.

The mix operator objected to the wasted effort involved in the job, and to the lower rate of pay for the time spent in preparation.

As a result of a search by his supervisor for a more efficient way of performing the job, the operation was first relocated close to the material supply. Oils most frequently used are now handled by lift truck and set into a permanent barrel rack on the floor above the mixing operation. The oil is piped to the mixing center, where it is withdrawn as needed into a mix tub set on scales, Fig. 2. Grain and other materials are brought by elevator to within a few feet of the mixers.

With these changes productivity has been doubled and operator morale is high, due to improved working conditions and less time occupied in nonproductive effort.

In another case, a large grinding disc required frequent turnover or complete change to insure a level surface for cutting specialty abrasive products. The disc is heavy and awkward to handle.

Now, an overhead monorail track supports the chain hoist. When the disc has to be turned or changed, the ends of a grab device, attached to the

hoist, are inserted into two holes drilled into each disc periphery and the operation is performed smoothly and with little effort.

Yet another improvement in testing procedures was made in the hardness testing of grinding wheels. The grading machine used for this was formerly attached rigidly to a building column. This limited the varieties of wheel sizes that could be tested because rearrangement to accommodate different sizes was difficult.

Relocation of the machine to permit vertical movement and a 360 deg swing, and the addition of an overhead monorail hoist, make it possible for any size or weight of wheel to be tested quickly and efficiently.

Plant-Wide Interest

Even personnel connected only indirectly with the manufacturing processes participated in the cost saving and work simplification program. An accountant questioned the use of first quality wire screening used in our furnace plant. Substandard material is now used, with no loss in performance, and at less than half the original cost. Annual savings amount to $5000.

Modifications came as a result of stimulating our supervising and staff personnel into working together, thinking and making method improvements in an organized way. A pilot group of four supervisors participated in 10 two-hour sessions, covering such topics as contribution of work simplification to good management; useful tools; materials handling; layout; motion economy; safety and housekeeping; human relations; and effective labor utilization.

So successful was this trial, that the program was expanded to include all supervisors, up to superintendent, and all engineering personnel at conferences. They were divided into compatible groups, separating each subordinate and his superior.

In each conference instruction was restricted to perhaps the first half hour, with the main emphasis on active participation. The participants were encouraged to obtain a bird's-eye view of jobs, through simple flow charts, diagrams, and activity charts; to use the principles of material handling and motion economy. Films, charts, case histories and other visual ideas were used for emphasis whenever applicable to the theme of the conference.

There is obviously no point in looking for possible improvements in an operation without first establishing the need for the operation itself. This is best accomplished by supervisory personnel who are in a better position to make methods improvements for cost reduction than any employee, because they visualize jobs in relation to one another and as part of an overall operation.

The continuing phase of the cost reduction program is achieved through monthly project meetings for all levels of management, as a form of follow-up to the work simplification conferences. Initially, the conferences were limited to department heads and the works manager, but now all levels of management are included.

Monthly Agenda

The monthly project meeting schedule begins with a session between each foreman and his assistants. An agenda is prepared by the engineer in cooperation with, and for, the foreman, and covers five topics:

1. Review of works manager's project list.
2. Points arising from this list.
3. Review of work simplification proposals.
4. Analysis of operations.
5. New ideas and production problems.

The foremen then meet with their respective superintendents, to give them information and ideas for improvements and solutions to production problems, to be considered at the top level conference.

The engineer attends each of these project sessions to provide continuity from month to month and to integrate the work of all supervisory groups.

Since the program has been functioning, we have observed that supervisors and technical personnel participate more cooperatively towards the success of the business, because they feel they are needed as an integral part of the organization.

Fig. 2. Relocation of mixing center, with oil piped from overhead supply, doubled production of grinding compound

Fig. 3. Use of overhead monorail and chain hoists enables grinding disc to be turned over with minimum of effort

Porcelain Enamel—

It May Help You With High Temperature Problems

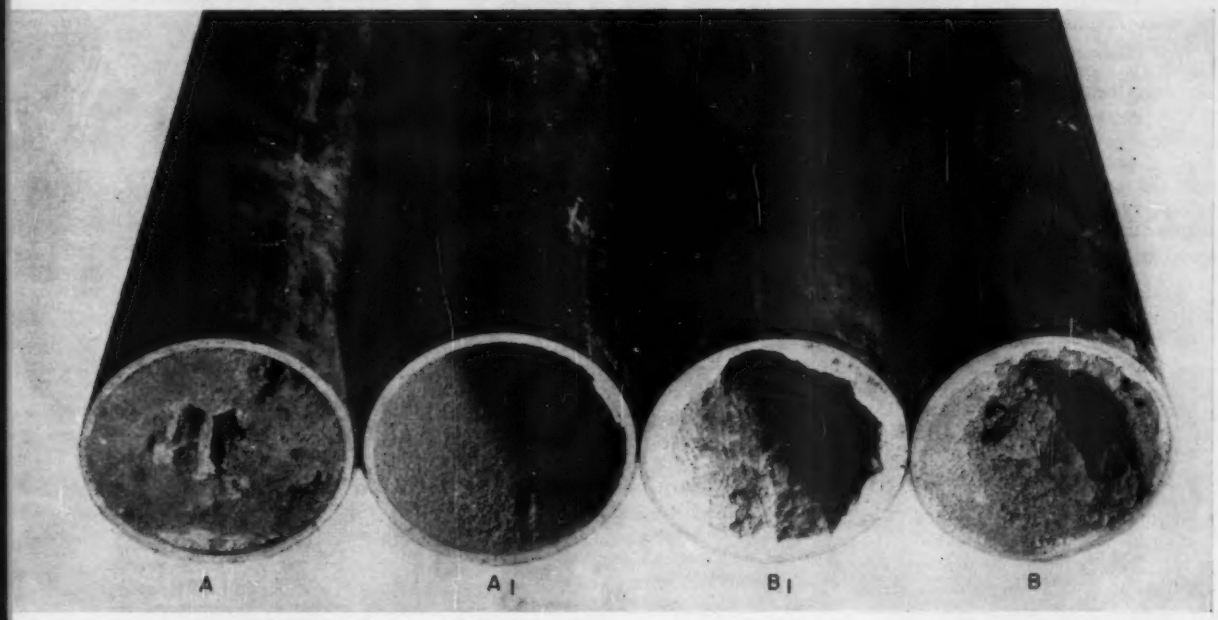


Fig. 1. Illustrations on this page show results of test conducted to determine the corrosion and clogging resistance of tubes coated with porcelain enamel and plain steel tubes in use in a boiler air preheater. The coated tubes, A and A_1, and the plain steel tubes, B and B_1, are shown before, left and right, and after, center, tamping to remove the fly ash

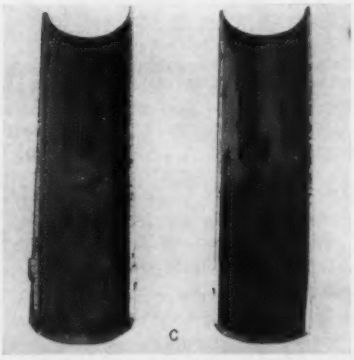
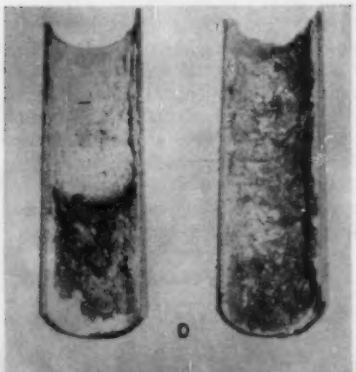


Fig. 2. The film of ash remaining on the coated tube could be removed by simply rubbing off with a bared finger

Fig. 3. Some fly ash on the plain steel tube could be rubbed off, but a white crust tightly adhered to the plain steel



FROM STUDIES and tests of the properties of porcelain enamel, Woodrow W. Carpenter, research director, of Barrows Porcelain Enamel Corp., Cincinnati, compiled a detailed analysis which should be of help to many plant engineers in solving high temperature problems.

Industrial porcelain enamel today can be roughly divided into two broad groups according to temperature ranges: one is used at temperatures up to 1400 F; the other, known as the high temperature ceramics, is used in applications from 1400 F to 2000 F. This latter group is opening up many new fields in industry.

Maximum high temperature limits of a glass coating are extremely difficult to define. In some cases, the maximum limit is in excess of the softening point. This softening point is also very difficult to define. A ceramic material does not go through a definite chemical or structural change at any given temperature. At room temperatures it would appear hard. Raise the temperature three or four hundred degrees and it would still be hard. Raise it a few hundred degrees more and the hardness would lessen. A few hundred degrees more and it becomes moderately soft then quite viscous and, at extreme temperatures, approaches the liquid stage. But at no point is there a definite change in physical character such as occurs in water at freezing and boiling points.

With these difficulties of definition in mind, it can be stated that ordinary enamel softens in the neighborhood of 800 F and has a maximum operating temperature of around 1100 F. A particular high temperature coating designed to be used in cold rolled steel will have a softening point of around 1200 F and a maximum temperature of around 1400 F. The high temperature ceramics for application to a stainless steel will have a softening point near 1400 F and a maximum operating temperature of 1800 F. When the temperature exceeds 2000 F, ceramic coatings have such little value in extending the life of the parts as to be economically impractical. However, there are cases where coatings will show improved condition at 2300 F.

Metals should be carefully selected for high temperature applications. The guide, Table I, affords a convenient method of determining metal specifications according to heat resisting properties. No attempt was made to evaluate physical properties at high temperatures. Temperatures are based on heat resisting properties only.

By following the suggested maximum temperatures, intergranular corrosion and rupture or failure due to fatigue strains at high temperatures can be avoided.

This summary is based principally on tests running 150 to 200 hours. Therefore, it cannot be categorically applied to more extended time applications. All metals are ceramic coated.

Constant heat application was made during these tests and it is suggested that, if heat application is intermittent, the maximum temperatures listed in Table I should be reduced approximately 100 F.

Welding Considerations

Welding introduces additional considerations. To be on the safe side, only 321 or 347 stainless steel should be used when welding is to be done. Both of these are stabilized alloys. They can be used interchangeably. If a non-stabilized stainless steel is welded, high temperatures may cause failure at the weld area under certain conditions.

Inasmuch as hardenability of certain metals and alloys used in the tests is materially affected by temperature applications such as might occur during application of ceramic coatings or in high temperature use, that factor should be observed when considering base metals or alloys to be used for ceramic coatings.

In general, the 300 series stainless steels — the chrome-nickel series — of the austenitic group are hardenable only by cold working. Therefore, hardenability is not affected by subsequent temperature applications such as might occur during application of ceramic coatings or in high temperature use in burner and exhaust systems.

Application of heat can affect the grain structure of the chrome martensitic group of stainless steels in the 400 series. These steels are age hardenable and may fail under high temperatures. The chrome ferretic steels, 405, 430, 442 and 446, are not hardenable.

Acid resistance in porcelain enamel coatings usually refers to a retention of gloss when exposed to mild household acid such as 10 per cent citric or 10 per cent oxalic acids. Some industrial enamels are proof against practically every acid in practically any strength except hydrofluoric.

Table II shows results using 25 and 50 per cent sulfuric acid solutions boiling at 230 F.

Other materials were tested at different strengths and temperatures. A high nickel alloy, in a boiling 65 per cent sulphuric acid solution showed a loss of 70 in. per year. Other acids, such as nitric and hydrochloric bore out similar results in the tests.

Less test information is available on alkali resistance but many glasses appear to have very good resistance to caustic solutions at room temperatures. Some apparently will stand up for several days or weeks at under 15 per cent caustic solution at 212 F.

Electrical properties of porcelain enamel are usually defined as having a potential of 1000 volts per 0.001 in. thickness. This is an optimum reading and any slight defect, thin spot or inclusion of a metallic imperfection would reduce this appreciably. It is probably not safe to design for a potential of more than 100 or 200 volts per 0.001 in. thickness. The surface resistance would be similar to most any other glass surface but not quite as good as the glazes used on electrical porcelain.

Hardness Tests

Hardness of glass coatings is often stated as between 4 to 6 mohs scale. This is about 500 Brinell or 70 Rockwell A hardness. Indications of hardness were determined by a Tabor Abraser Test run on a number of porcelain enamel coatings, alloys, and metals. In this test, grinding wheels worked away at the materials and results were measured after 40,000 revolutions of the grinding wheels. Table III gives the results of this test.

Thermal Shock Characteristics

Thermal shock characteristics will vary considerably with the type of glass used. Ordinary enamels will generally withstand a thermal shock from well above boiling to cold water. High temperature coatings on cold rolled steel will stand repeated shocking from about 1000 F to —60 F.

Thermal shock of coatings on stainless steel is best illustrated by use of these coatings on jet engines. Where the engine is in full operation at 1800 F at high elevations, a complete cut out of power will immediately subject the engine to a —60 F blast of air. This condition is successfully met.

Mechanical shock properties are hard to define since there is no scale of measure. In general, the mechanical shock resisting values will be in inverse ratio to the thickness of the coating. Ordinary finishes will run from 0.008 to 0.020 in. thickness. High temperature finishes on cold roll will run 0.003 to 0.004 in. and the high temperature ceramics on stainless will be from 0.001 to 0.0015 in.

A rough rule is that the coating will hold intact up to the yield point of the metal base. With some extremely thin coatings on thin metal, it is possible to go beyond this point. Mechanical shock properties are often amazing when an extremely thin layer is applied to a very durable or heavy gage base.

Reflectance of a super white porcelain enamel, one coat finish, about 0.008 in. thick will run from 82 per cent to 86 per cent.

Emissivity factor of porcelain enamel is about 77.4 as compared with 4.0 for aluminum and 15.8 for stainless steel. This factor of emitting, or giving off, heat is often important in heating units or heat exchangers.

Table I. Temperatures suggested are based on heat resisting properties only

Metal or Alloy	Maximum Temperature (Deg F)
1010 steel	900
NAX series steel	1000
4340 steel	1100
430 chrome steel	1100
Timken steel	1300 to 1400
Cast iron	1400
Inconel W (heat treated)	1500
347 stainless steel	1700
304 stainless steel	1700
Inconel C	1800
309 stainless steel	2000
310 stainless steel	2100
314 stainless steel	2100
321 stainless steel	2000
446 stainless steel	2000

Table II. Results of 25 and 50 per cent sulfuric acid solutions boiling at 230 F

Material Tested	Loss in Thickness (in inches per year, 25% sol.)	Loss in Thickness (in inches per year, 50% sol.)
Enameling iron	140.0	——
Barrows P.E. No. 9	5.76	1.15
Barrows P.E. No. 13	0.07	0.05

Table III. Results of hardness test, using grinding wheels to classify coatings

Material Tested	Weight Loss (in grams)
Barrows P.E. No. 13 coating	0.015
A-418 alloy coating (high temperature resistance)	0.040
Hard nickel	0.065
Solar 5210 alloy coating (high temperature resistance)	0.065
Stainless steel	0.1525
Barrows P.E. No. 9 coating	0.159
Chromium	0.302

Water Usage Reduction—

Thermo-Electric Unit Controls and Cuts Flow to Drain

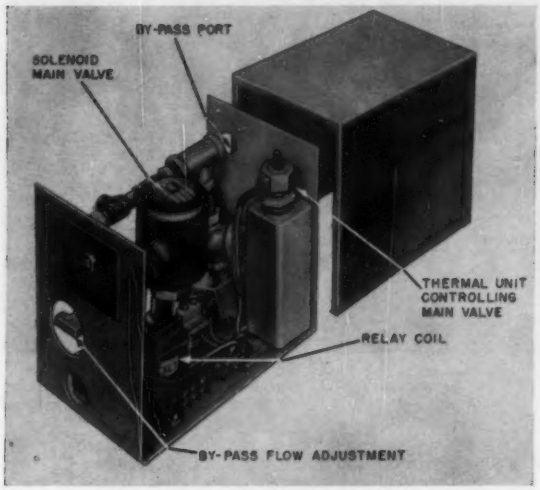


Fig. 1. This is the device that does the work of controlling flow of water

THE OPERATOR of water-cooled machines such as induction heating equipment, resistance welders, hydraulic systems, and air compressors has two important responsibilities: first, remembering to turn the water on when the equipment goes into use; second, shutting off water flow at the end of the operating cycle, but not before the machine has cooled to a safe temperature.

To be on the safe side, many operators allow the cooling water to flow continuously, even though the machine may be used intermittently. Large amounts of water can be wasted this way. A more foolproof and economical procedure is to install a simple, automatic flow valve on the water lines.

An automatic valve can reduce water consumption substantially, while at the same time assuring positive cooling. For example, a large midwest manufacturer of farm implements installed such a valve in a cooling water line to a 300 kva projection welder. Metered water consumption before installation averaged 3,802 gal per day; after installation, it dropped to 641 gal—a saving of 3,161 gal per day on a single welder.

One regulating valve of this type, called the Water Mizer, Fig. 1, is designed to assure an adequate coolant supply at all times, while eliminating waste. It automatically turns on the water supply as soon as it is needed and turns it off again as soon as the equipment has safely cooled. It consists of a solenoid-operated water valve and a thermostatic shut-off.

When the valve is used with welding equipment, an air valve solenoid coil or clutch solenoid on the welder opens the valve in the control unit through a relay. With other equipment, the valve may be wired to the contactor coil. As long as the operation continues, the solenoid holds the valve open, providing a full flow of water to the equipment. A return line from the equipment carries the water back to the control unit where the flow is monitored by a Thermoswitch before going to drain. A pilot light indicates when the water is flowing through the valve.

Thermal Delay

The precision thermo-electric switch is normally open and, as shown in Fig. 2, is wired in series with the water valve solenoid. As soon as the water temperature in the return line exceeds 100 F, the thermostat contacts close to form an alternate circuit to the valve solenoid. When the weld is completed, the air valve solenoid, controlled by the welding machine, is de-energized. However, because of the parallel circuit through the thermostat, the valve is held open as long as the temperature in the return line exceeds 100 F.

This feature is not a time delay, but a thermal delay. It therefore corrects for such environmental variables as ambient temperature, pressure changes in the water supply, and varying periods of equipment use—all of which can affect cooling efficiency. When the return water drops below 100 F, indicating a safe equipment condition, the thermostat contacts open, de-energize the solenoid, and cut off the water flow.

The thermostat is set at 100 F to prevent low temperature water from collecting in the feed lines to the machines. Otherwise the lines would sweat and possibly cause corrosion problems around the equipment. The thermostat itself is installed directly in the return line by means of a threaded fitting. The outer shell of the thermostat, which extends 3 in. below the threads and is ⅝ in. in diameter, is itself a functional element. Expansion or contraction of the shell is transmitted to low-expansion internal struts, making and breaking a set of contacts on the struts, and thereby actuating the control circuit. The unit has an inherent sensitivity of 0.1 F.

The unit can be used in cooling water lines for either pedestal or gun type welding equipment. In such installations, the transformer and contactor receive a small continuous by-pass flow around the unit's main valve. The by-pass flow is adjusted so that it is just large enough to keep the flow switch in the ignitron contactor from operating. This enables the transformer to continue cooling even after the solenoid valve has closed.

The by-pass flow is replaced by a full flow (½-in. port) as soon as welding is started. Although the transformer and contactor can be put in series in the main water line if desired, the by-pass arrangement is recommended to assure a supply of water to the equipment in the event the main line becomes blocked.

Fig. 2. Wiring diagram of control unit

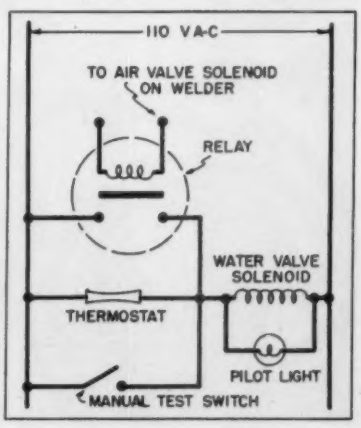


Fig. 1. Applying a non-slip material on ramps reduces the hazards of falls and simplifies use of dollies, hand trucks

Photos: Minnesota Mining and Manufacturing Co.

Fig. 2. In cartage areas, where employees may not always be able to see slippery spots, such surfacing is helpful

How to Reduce Accidents in Slippery Areas

NEARLY HALF A MILLION workers are injured in on-the-job falls annually. To help bring this figure down, industry is employing numerous safety features to prevent accidents in plant operations.

One means of reducing or eliminating falls due to slipping is to use a non-slip material in critical areas where the floors or platforms may be wet, oily or greasy.

Illustrated on this page are several examples where a non-slip material has been installed to help prevent accidents. Other plant operations where it may be applied are: the maintenance and storage areas where floors may become wet or greasy; on the steps of ladders, to help prevent falls, give the employee a sure footing; in the plant shower or locker areas, where soap and water present a slipping hazard; also loading platforms, heavy-traffic stairways, etc.

Fig. 3. By placing non-slip surfacing near the machine, the danger of a possible fall because of a slippery floor is lessened

Fig. 4. Floor surfacing will provide sure footing for employees when their shoes may have snow, rain or mud on them

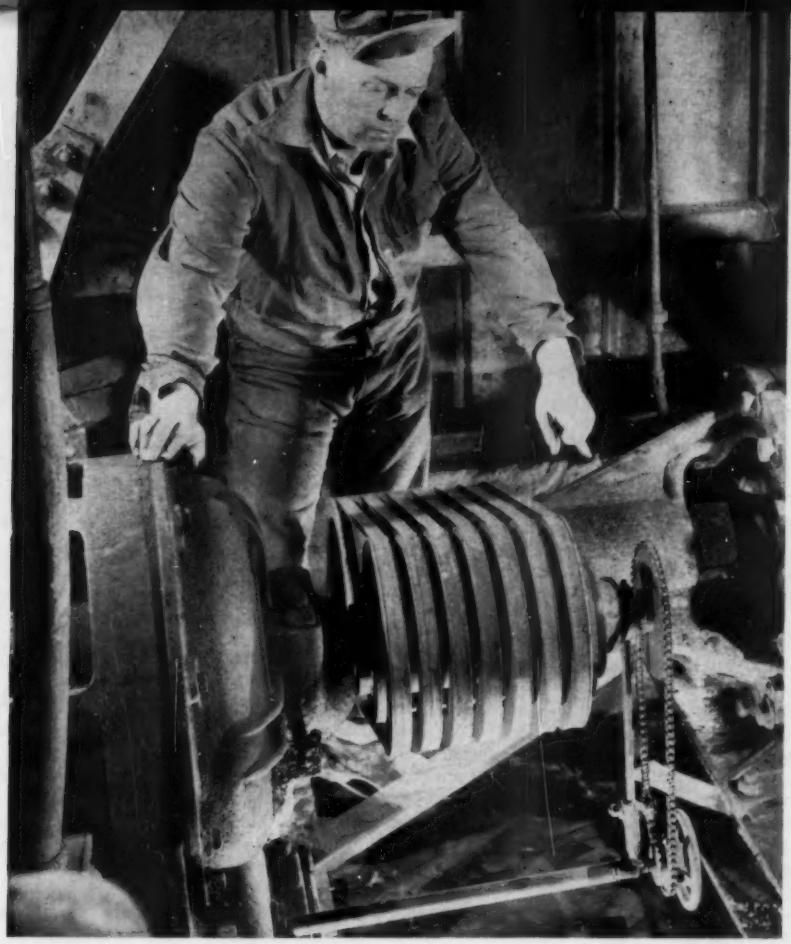


Fig. 1. This drive design uses a roller chain to effect changes in pitch diameter

Roller Chain Applications—

Disclose Versatility of This Power Transmission Device

By F. E. RILEY, Mechanical Engineer

THE DESIGNING and building of special rigs and equipment often falls within the duties of the plant engineer and usually such equipment must be constructed as economically as possible. It is a well-known fact that stock equipment purchased "off the shelf" is far cheaper than items made up in the plant engineer's shop; therefore, the designer of special equipment should be aware of what is purchasable economically and should also study ways in which it can be utilized to save time and expense.

Apart from their recognized duties for transmitting rotary motion, standard sprockets and chains can be used for a wide variety of devices, motions and operations; this article describes a few of these special applications. The illustrations are in schematic form to illustrate the working principles of the applications which can be modified to suit specific operating conditions. Most chain manufacturers have a standard line of chain attachments such as are described, but if these are not available, they can usually be made up quickly in the machine shop.

Load Suspension

One of the simplest applications of standard roller chain is that of supporting material, suitable for round or irregular sections. The flexibility of the chain makes it particularly adaptable to the profile of the suspended part. If small-pitch chain is used, the addition or removal of links will permit close height adjustment. As an example, a 3 in. pitch simple roller chain with a breaking load of 90,000 lb and anchored at its two ends will support 36,000 lb with a factor of safety of 5. Chains are available with breaking loads up to 320,000 lb.

Chains are valuable for suspending heavy objects and the way in which they can be applied is illustrated in Fig. 2, which shows the suspension of a static weight. The chain ends are connected to the supporting member and to the weight by adaptors. These adaptors comprise threaded studs with enlarged heads. The head may be slotted to take the inner links of the chain or machined to take the outer links; both types of adaptor are shown in Fig. 2.

Another method of securing a narrow weight to the end of the chain is to use a special end attachment link which comprises a pair of flat links connected together by a large diameter bolt at one end. The large bolt

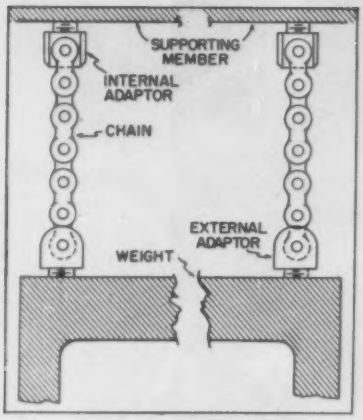


Fig. 2. Two means of chain attachment

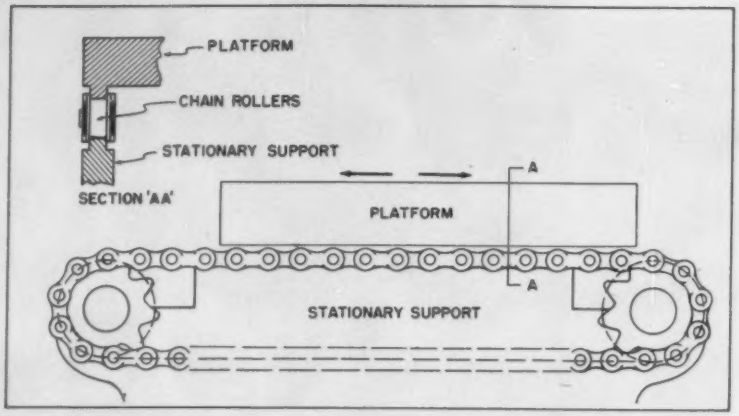


Fig. 3. Continuous chain provides roller bearing type of support for platform

fits through the narrow plate and can then be made of low shear-strength material.

A freely travelling sliding platform can be mounted on a length of roller chain as illustrated in Fig. 3. The rollers act in the manner of roller bearings and are already mounted in a continuous chain for efficient operation. The platform runners and the stationary supports below the chain are the same width as the rollers themselves and fit between the side plates of the inner links, as shown in the section through one of the guides in Fig. 3. When the platform moves longitudinally on the rollers it will cause them to travel along the stationary bottom support; the chain is endless and runs over the pair of sprockets placed at either end of the assembly.

Platforms

For high precision sliding platforms, chains having rollers ground to fine tolerances are obtainable. Such a chain of ¾ in. pitch will support a weight of 50 lb per roller. Precision platforms will require the upper and lower guides to be hardened and ground, but for general applications, the guides can be of unhardened steel.

Another straight-line movement obtainable by using standard roller chain in combination with a pair of parallel guides is illustrated in Fig. 4. It is a highly efficient thrusting or clamping mechanism with a toggle action whose mechanical advantage is variable according to the slope of the chain links. The wide range of chain pitches available enables many forms of this device to be made up.

The right hand end of the chain is anchored to some immovable support and the other end is connected to a screw-motion which applies pressure to the chain link. Shortening the distance between the two end links of the chain causes the two straight-line guides to be forced apart with considerable force.

An arrangement like that shown in Fig. 4 can be used in combination with the sliding platform of Fig. 3, in cases where the platform has to slide vertically and must have support from both sides. The toggle action arrangement enables the running clearance of the guides to be adjusted; the diagonally disposed links work in the manner of an adjustable gib strip.

Lifter Link

Mechanisms in which it is desired to actuate a trip or latch at regular intervals of time are commonly required in special machinery and these can prove extremely expensive. An economical way of making chain do the job is illustrated in Fig. 5. A single sprocket has an endless chain running over it with the bottom of the loop running freely. The small lifter incorporated in one link of the chain passes over the top of the sprocket at regular intervals and lifts the arm shown.

With the variation of the chain length, various time cycles between trips can be obtained; a shorter chain will pass around the constant-speed sprocket a greater number of times per minute than will a long chain. As an example, using a 20-tooth sprocket and a chain length of 200 pitches, the

Fig. 4. Strong clamping force can be realized through toggle-action of chain

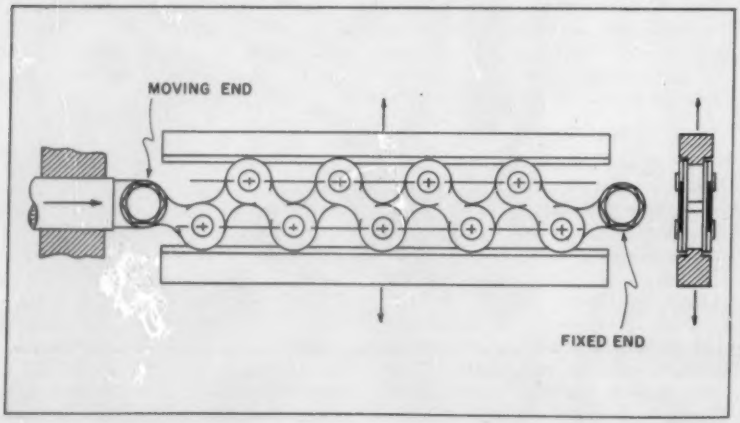
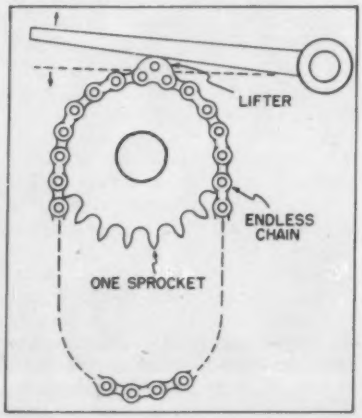


Fig. 5. Fitting in chain for tripping



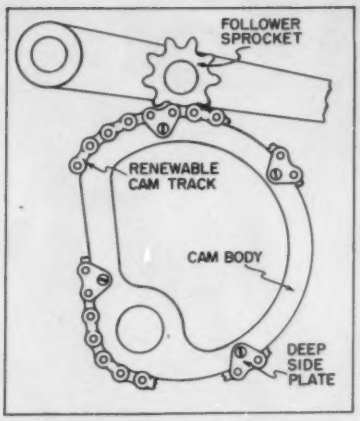


Fig. 6. Chain increases life of cam

trip would operate every 10 revolutions of the sprocket.

The lifter itself is made from special deep side plates which are built into the chain and form the outer links of one pitch distance; a roller is attached between the side plates. This bears against the lever arm. The deep side plates are a standard chain fitting and are very useful for attaching chains to machine parts or for attaching parts to the running chain.

Cams which are difficult to lubricate are notorious for the rapidity with which they wear out. If the cam is hardened, it is difficult to remake accurately. Soft cams are easier to make but wear out very quickly. A renewable hardened cam track can be made from chain in the manner illustrated in Fig. 6, which also shows another use of deep side plates.

If a cam is made in the first instance with roller chain attached to its exterior, the replacement of the track when worn is the only maintenance job required throughout the life of the cam. A more efficient follower than the usual solid roller is provided by the sprocket, which acts as a follower. The initial layout of the cam body to suit a given number of chain pitches is more difficult than laying out an ordinary smooth profile, but it has to be done once only. The initial accuracy of the cam can be maintained indefinitely by fitting replacement chains.

There is a simple and compact method of transforming motion from straight line to rotary, and the other way round. In this, the free end of the chain must have tension applied to it by a spring or weight. The chain lies around the periphery of a plain circular disc which fits between the inner links and is in contact with the outsides of the rollers. The strength of the chain, in comparison with other flexible devices, enables the mechanism to be of small size.

For example, with a ½ in. pitch chain and a disc of 2 in. diameter, a pull on the chain of 400 lb will produce a torque on the disc shaft of about 33 ft-lb. Similarly, a straight line movement of the chain will impart to the disc a rotation of 270 degrees.

An ingenious reciprocating device made from standard chain is illustrated in Fig. 7. The endless chain runs continuously over the two end sprockets and has a single deep side plate link in one part of its length. This link is attached to a member sliding vertically in the slot of the reciprocating part of the mechanism. It is one version of the old slotted link device, except that it is extremely compact.

Application of chain to this device gives the advantages of harmonic acceleration and deceleration at the ends of the stroke and uniform speed of the traversing member between the shaft centers. Various traversing speeds can be obtained from the wide range of chain and sprocket sizes available. A typical application using 1½ in. pitch chain on 12-tooth wheels running at 10 rpm gives a 5 ft traverse of 21 sec between start and stop.

"Gear" Service

Another method of obtaining straight line motion is to use a rack and pinion. A cheaper alternative to the rack and pinion is a system in which a length of chain forms the rack and the pinion is a standard sprocket wheel. The chain is laid on the stationary part of the machine and is secured endwise. It is also firmly supported at one side to resist the thrust of the sprocket which is mounted on a spindle attached to the sliding carriage. Rotation of the sprocket causes straight line movement of the carriage along the bed or guides.

Plant engineers are familiar with

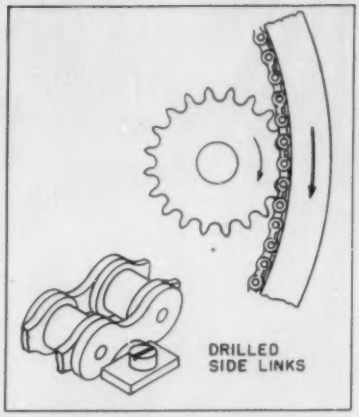


Fig. 8. An unusual use of roller chain

the high cost of large diameter internal ring gears and a way of obtaining a low-priced substitute is illustrated in Fig. 8. In this case, the chain is attached to the interior of a hollow cylinder by means of special L-shaped side links which are drilled for attachment screws. The links are a standard product of one chain manufacturer and are a further method of attaching chains to machinery. For an internal gear, each alternate link must be anchored down, but for an external gear of large diameter anchorages placed at 20-pitch intervals will often prove suitable.

Typical applications of this method of making large gears is for mixing drums, welding manipulators and synchronized turn-tables. Heavy loading can be provided for by using duplex or triple lengths of chain with double or triple sprockets. An alternative method of fixing chains to large diameters is to place them in contact with a peripheral shoulder that has been machined on the part and to make use of long link pins which project into the wall of this part.

Fig. 7. Good use of chain and sprockets is made in this reciprocating system

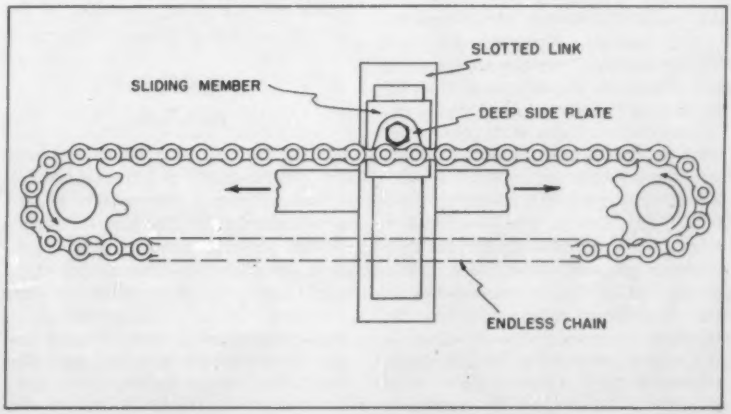


Fig. 1. Boxed refrigerators move automatically from production to warehouse via more than half a mile of conveyors

Fault-Finding Panel Pleases G-E—

Checks Up On 3000-Ft Conveyor System at Appliance Park

SEVEN HUNDRED refrigerators an hour move automatically across more than half a mile of grounds at General Electric's Appliance Park, Louisville, Ky. Yet they're not in anyone's way.

The movement is handled by an unusual conveyor system containing nearly 4,000 ft of conveyors powered by 64 electric motors.

Starts, Stops System

A central operator at a "fault-finding" panel can start or stop the system at any moment. By a signal system, the panel permits the operator to locate and determine the nature of the fault the instant it occurs.

Manufactured by the Milwaukee plant of the company's Industry Control Department, the motor control is a key component in the conveyor system. The system was developed to meet a need for moving the packaged major appliances some 3,000 ft from production building to warehouse without interfering with road or rail traffic.

There is no waiting for the cartons or for a place to put them, either at the production building or the warehouse. The cartons are delivered at a rate equal to production, with a metered maximum to eliminate undue surges at the discharge end. Packages on the conveyor line at the end of the day are allowed to remain in place.

As the cartons are received from the assembly lines on three make-up conveyors, they are automatically marked with distinguishing spots of ink and grouped into trains approximately 24 ft long.

Approaching the exit lines, the trains are identified according to the spots by a set of photoelectric scanning units, and are switched onto one of six lines as indicated by the spots.

Switching

Spot selections may be set to switch the product trains to any exit line. If a line is broken, turned off, or full, trains destined for that line will switch to the next adjacent line—or to the next one that can accommodate it.

Storage area is provided in each exit line. In no event are the trains stopped in transit, except during rest periods or for emergencies, until they reach the storage area.

Movement of the cartons on the conveyors is controlled by photoelectric relays. Signal stations are composed of two relays, each with an indicating light on the "fault-finding" panel. In this manner the operator can tell immediately if a photoelectric device has failed and have it repaired while the second unit at that station continues to operate the conveyors.

System Requirements

General Electric's Appliance Park is presently composed of five production buildings and one remotely located central warehouse. The system had to meet many requirements.

It had to deliver the major appliances in banded corrugated cartons safely and economically. It had to sort them into a number of product groups, even though the cartons might be identical in size and weight. It had to be operated by one man for normal duty.

The system had to receive the cartons as they were discharged from the production lines and since there was no storage space available, it had to provide limited emergency storage. It had to be easily and quickly repairable in the event of a failure, to minimize

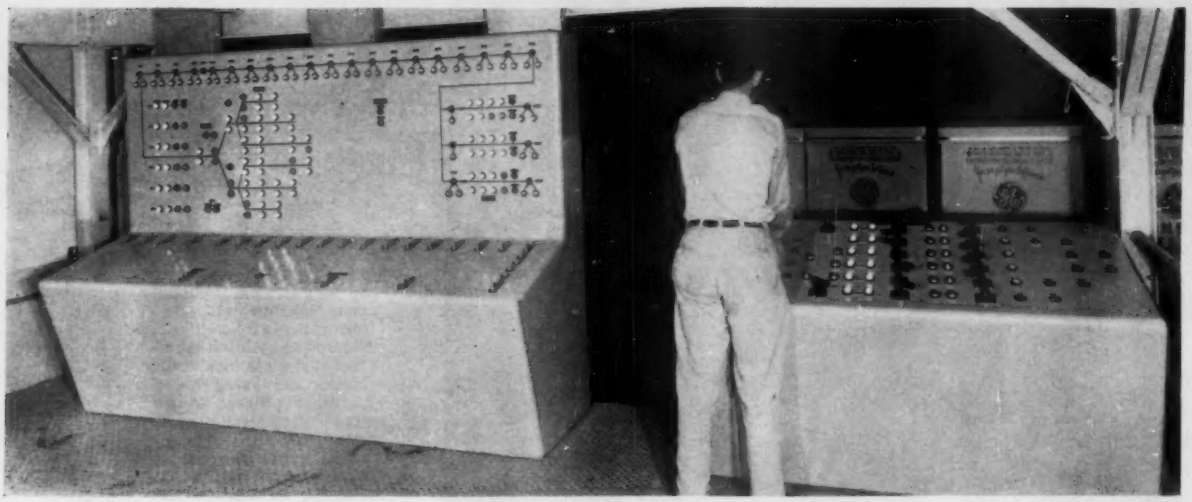


Fig. 2. Any failure along the 3000-ft conveyor is indicated by signal lights on the "fault-finding" panel at left

"down" time and the resulting production losses. Above all, it had to be reliable, since it would be the only fast flow outlet for the production.

All of the requirements were met by a floor type, roll-to-roll progressive chain driven live roller conveyor system located in an elevated, enclosed trestle.

The transport system remains high enough to clear trucks and railroad cars until the cartons on it enter the warehouse. At that point the conveyors start a gradual decline to an elevation of approximately two feet to the top of the carrying surface above the warehouse floor.

Train Dispatching

When a train is complete it is dispatched through a series of holding stations which provide emergency storage in the event of a failure. The trains are automatically dispatched from the last holding station in each line through converging sections and emerge onto a main single line transport conveyor.

A timing device and a series of electrical control relays dispatch the trains in the order they arrived at the last holding station. They are dispatched at a minimum spacing of 50 ft on the transport conveyors to govern the maximum load on any conveyor and to have a gap between trains that will permit a device to sort the trains automatically at the discharge end of the system.

In the event of a failure somewhere on the transport line, all holding stations in each receiving line may be filled before production is stopped. These stored trains will automatically move onto the main line when normal operation is resumed.

Interlocked Conveyors

The transport line is made up of multiple conveyors, each independently driven but interlocked such that trains will not feed onto a stopped conveyor. In the event of a failure the conveyor at fault and all transport conveyors preceding it will stop. Manual controls are provided at each conveyor for testing and lock-out protection of workmen.

Each conveyor is provided with a drive near the center and an indicating switch on each end roller. Should any end roller stop the drive motor for that conveyor, the control operator is notified by a system of panel indicating lights.

The discharge end section of each storage line is a powered declining section arranged such that it receives approximately 12 ft of cartons without packing them tightly together. Normally a truck and trailer backs up to the end of the declining section and receives the cartons on it. As soon as the truck leaves, the declining section refills and waits for another trailer and truck.

The truck and trailer combination is used for long hauls of products. When the driver gets to the desired location he tilts the hydraulically controlled trailer until the cartons move off onto the floor. Fork trucks then take the products two at a time and either stack them or load them into trucks or railroad cars.

For short hauls and in-the-area stacking, cartons may be removed from the declining exit lines by fork trucks from the side because of the loose grouping. Normally, side removal is not required except for emergency operations or rush hour relief.

The conveyor system is provided with an operator's panel at the receiving lines which is used for manual emergency operation only. There is also an operator's panel at the exit lines for manual emergency operation.

Automatic Operation

Operation of the system is completely automatic. An operator is required at the fault-finding panel and standby personnel are required to remedy emergency conditions. The system has resulted in a transport method that is out of the way and very reliable. It is easily maintained and by the nature of its construction can be easily and quickly repaired. Extremely flexible, it lends itself to many types of operation.

The roller sprockets and bearings show no noticeable wear after five months of operation. The boxes are always delivered at the exit lines 40 minutes after they leave the production line. Boxes are not damaged and there is no danger of dropping or breaking in transit.

Fig. 1. Field erection of an aluminum cellular glass curtain wall. Interior panel has been secured to building members and glass insulation blocks are being glued to inner panel. Next step is fastening exterior panel, through insulation, to building members. Construction site for all illustrations is a bottling plant for a Pittsburgh, Pa. brewery

Thin-Wall Construction—

Sandwich Panels Boost Building Baby into Big Time

By **WALTER LOVETT**, Engineer, Pittsburgh Corning Corp.

EVER SINCE the development of a steel frame for buildings, architects, engineers and designers have been working on the design of a lightweight wall for enclosing the building. The component to date which seems promising is the sandwich type of wall unit, composed of a core material laminated between two skins.

In order for a sandwich wall to gain its deserved recognition in the building industry it should be designed with the following requirements in mind:

1. The wall must be light in weight in order to reduce the dead loads on the structural steel, to reduce the cost of transporting the sandwich to the building site and to facilitate handling during erection.

2. The sandwich should be as large as practical so that it will enclose the greatest area of the building per panel erected.

3. The sandwich panel should have adequate fire rating to meet the local building code.

4. The sandwich should have a better resistance to the transfer of heat than the conventional wall.

5. The sandwich should be designed with the cost factor in mind. This means the use of a reasonably cheap adhesive to fabricate the panel and the elimination of any complicated fastenings or special equipment to erect it.

As for reducing weight with sandwich panels, a wall may be designed using a metal skin sandwich panel to weigh not over six pounds per square foot—including the weight of the aluminum or steel framing members holding the panels in place. Comparing this with a 12-in. brick masonry wall weighing 130 lb per sq ft, the reduction in dead load on the building is obvious.

Comparison of the thermal insulating values of sandwich walls and masonry walls shows a decided advantage for the sandwich wall. Twelve inches of masonry has an overall "U" value of approximately 0.36 Btu/hr/sq ft/deg F. Comparison with a metal skin sandwich (its insulating core having a "k" factor of 0.38) with an overall "U" value of 0.16 Btu/hr/sq ft/deg F, shows the sandwich wall to have better than twice the insulating value of the masonry wall. This high insulating value will reflect a saving

in air conditioning and heating costs during the life of the building.

Compare the cost of sandwich walls with the conventional wall. In some cases we have found the initial cost of the metal sandwich higher but during the life of the building there will be less maintenance. Time will be saved during erection, which is a saving in total cost. For an example of cost, porcelain enamel skin sandwiches combined with various insulating cores will cost $2.75 to $3.75 per sq ft, excluding erection.

Job-Site Erection

The Anaconda Aluminum Company in Columbia Falls, Montana has used sandwich construction to insulate their large warehouses. It is different from those previous, however, in that this sandwich was fabricated and erected at the job site. It combines a back sheet of H. H. Robertson Company's 22-gage Galbestos corrugated siding, cellular glass core, and a 16-gage fluted aluminum outside facing. Also, it is not a true sandwich, with a core fastened to the two skins with an adhesive, since the two facings are held together with a metal "Z" member. This type of construction is very economical and provides good insulation.

In field fabrication these steps were followed: 1. Galbestos was fastened to structural frame; 2. Z-bars were attached to the Galbestos; 3. Foamglas was applied to Galbestos, using an adhesive; 4. Fluted aluminum facing was attached to Z-bars to form outer face of building.

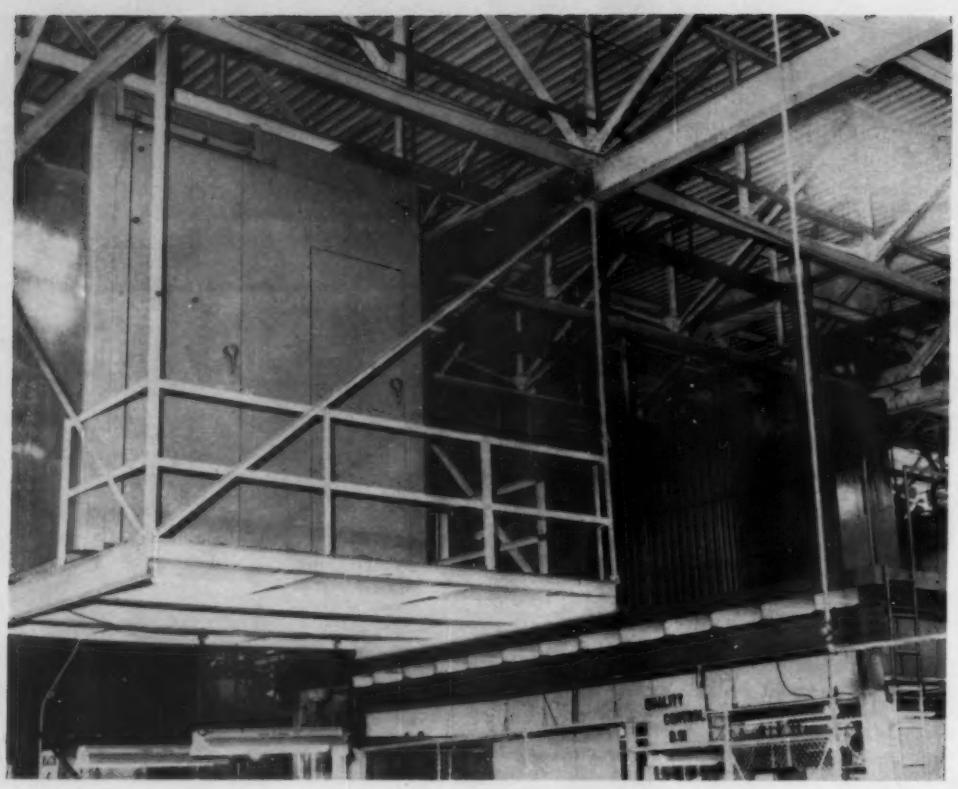
As for the future of sandwich walls, it has been estimated that in ten years, more porcelain enamel will be used on building exteriors than is used in all household appliances today. Also, the steel and aluminum industry estimates that there will be a 25 to 30 per cent increase in stainless steel and aluminum for architectural use in about ten years. Considering this with the fact that metal walls must be insulated with a back-up insulation or combined with the insulation into a sandwich, a tremendous market for sandwich construction should exist.

For cost consideration, the sandwich wall is still in the custom building stage but when more experience is gained, it certainly will mean a reduction in cost of the wall. Even in the present stage, however, sandwich panels are competitive and sometimes lower in cost than masonry.

Maintenance-wise, there are less joints that require calking in the building, and no pointing has to be scheduled every few years. The nature of the exterior surface takes advantage of natural rain-washing, so cleaning is a minor consideration.

Fig. 2. Closeup of thin-wall components. Foamglas insulation is 1½ in. thick

Fig. 3. Final step in wall construction is bolting exterior panel to building



Capacitors at Maytag are placed on platforms hung from the roof trusses. This photo shows steel cabinet containing main bank of capacitors and protective equipment for Point A, Figures 1 and 2

Maytag's Capacitors Cut Voltage Dips

Result: Better Welds, Lighting and Motor Starting

By T. H. McGREER[1], Engineering and Service Dept. Westinghouse Electric Corp., Chicago, Ill.

USE OF SERIES capacitors in the distribution system at the Maytag plant, Newton, Iowa, has eliminated serious voltage fluctuations resulting from operation of low-power-factor welders. Prior to application of the capacitors, the largest voltage dips (caused by simultaneous operation of more than one welder) were sufficient to cause inferior welds.

Power is distributed at the Maytag plant through a 4160-volt radial system that feeds power centers of 500- to 1500-kva capacity. Standard bus duct is used for the low-voltage system to provide the necessary flexibility to meet the demands of changing processes and tools. See Fig. 1.

Fortunately, the single-phase welders are concentrated in the areas served by two of the power centers, so that their effect on other equipment is minimized.

Using data supplied by the manufacturers of the welders, the voltage drop was computed when three of the largest welders operated simultaneously. The calculated drop was 27 per cent. Later an oscillogram showed a 25 per cent drop in voltage and the latter figure was adopted in computing the distribution of the drops as shown in Fig. 2. The largest drop, 11.6 per cent, was across the power center transformer. The next greatest drop was in the bus duct, 8.3 per cent. The drop at the 4160-volt bus was 4.8 per cent — a minor part of the drop to the welders, but of major importance to other circuits.

The voltage regulator had no effect on these rapid fluctuations, its purpose being to maintain an average voltage slightly rising with load. The regulator was equipped with a time delay relay, so that it made no attempt to compensate for momentary fluctuations in the voltage. In fact, a regulator without time delay actually would be too slow to cope with momentary fluctuations and would tend to make the extremes of the voltage swings even greater.

Although the extreme voltage drop of 25 per cent occurred only occasionally, and even then did not always result in welds that would actually fail in service, the reputation of the manufacturer's product was involved and not even a small number of poor welds could be tolerated.

Inspection techniques rigid enough to discover all defective welds are economically impossible. Therefore, techniques had to be evolved that would make all welds adequate.

It should be remembered that the voltage drops shown on Fig. 2 were momentary and occurred only at random intervals, averaging twenty to thirty minutes apart. Lesser drops were occurring much more frequently.

[1] Mr. McGreer has left Westinghouse since writing this article and is now with Sargent & Lundy, Consulting Engineers, Chicago, Ill.

Two per cent fluctuations were taking place almost constantly at the 4160-volt bus.

For example, a cleat might be held in place by three spot welds, any two of which would provide sufficient strength. If the probability is that only one in 1000 welds will be defective, the theoretical probability of two bad welds in succession is only one in 1,000,000. Practically, however, the three welds are made in rapid succession, and the probability of all three occurring during a low-voltage period caused by other apparatus is nearer one in 1000 for the particular example.

Best possible arrangement of welders on the three phases did not eliminate the possibility of three or more welders overlapping on the same phase several times a day. Interlocks were considered to prevent the larger welders from interfering with each other, but the idea was abandoned because of complexity in a plant where welders were being moved and new ones added almost weekly. Furthermore, wages were based on an incentive system and the interlocks could cause difficulty in establishing rates.

Possible Solutions

A voltage drop of 10 per cent has been generally considered a maximum for good welding. In this case, 7 or 8 per cent was made the goal. This meant that approximately two-thirds of the impedance to the welders would have to be removed.

Thus, the problem was to decrease the voltage drop to the welders satisfactorily and economically. Also, it was highly desirable to remove as much as possible of the fluctuation in voltage at the plant bus.

There were four possibilities:

1. Increase the capacity of the 3750-kva transformer and the power center transformers and replace the 480-volt standard bus duct with low-impedance bus duct. This scheme had the advantage of providing capacity for future growth, but had to be abandoned because of cost. Because of inability to interrupt the increased short circuit current, it would have been necessary to replace all of the 4160-volt switchgear and a great deal of the 480-volt switchgear as well as other equipment.

The installed cost of the new equipment necessary for this scheme was estimated at $105,000 if the 4160-volt switchgear was replaced, and $65,000 if it were not.

2. Use series capacitors in the two 4160-volt feeder circuits to the welder loads as well as replacement of the standard 480-volt with low-impedance bus duct. This would provide good voltage conditions at the welders, but would not decrease the fluctuations at the main bus. The cost of this change was estimated to be $50,500.

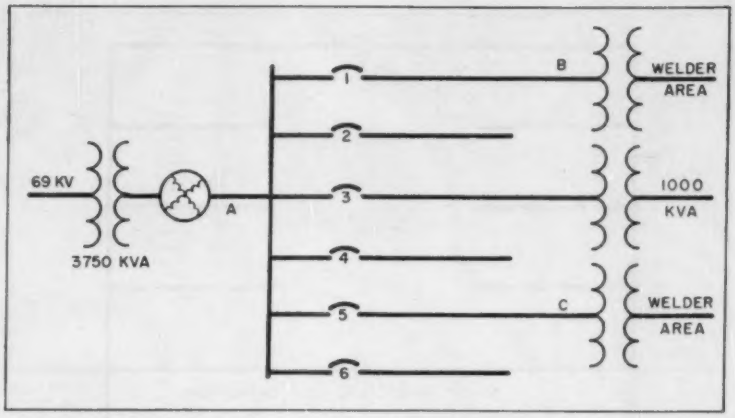


Fig. 1. One-line diagram of the electric distribution system at Maytag plant

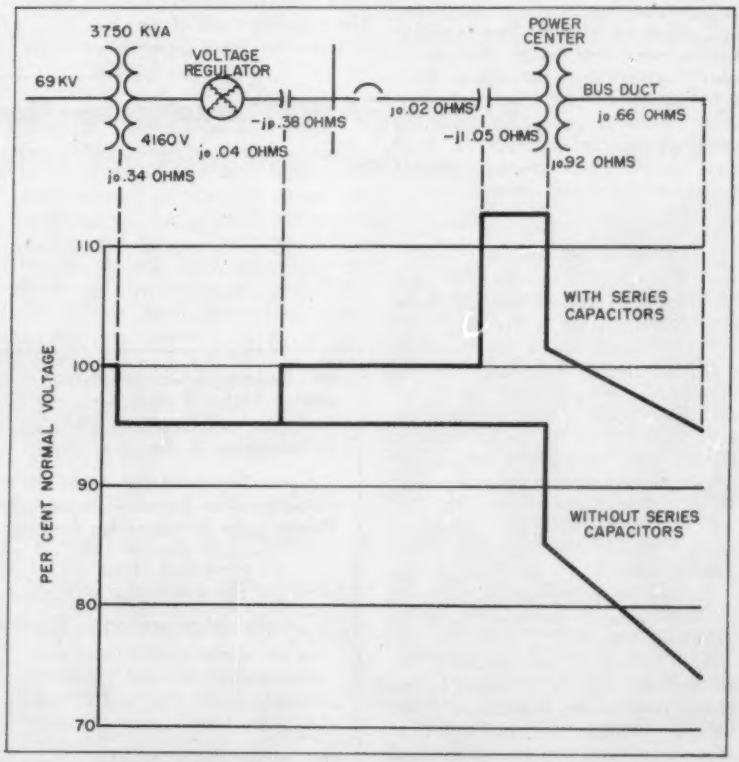
3. Provide a completely separate 69-kv power supply to the welders, with impedance low enough to maintain proper voltage for all welding conditions. This plan was also out of the question economically. The estimated cost was $69,000 for a single substation.

Since this would place all of the welders on one circuit, there would still be occasional poor welds because of four or five welders operating simultaneously. Two substations would eliminate all poor welds caused by low voltage but at a cost of more than $100,000.

Even at this high cost the remaining 4160-volt system would have been unchanged and unavailable for future highly fluctuating loads.

4. Install series capacitors both on the incoming circuit and on the two welder feeders. This plan was adopted for the following reasons: a. It met the goal of 7 or 8 per cent maximum fluctuation at the welding loads; b. It also removed the objectionable fluctuation at the plant bus. Oscillograms

Fig. 2. Voltage profile both before and after series capacitors were installed



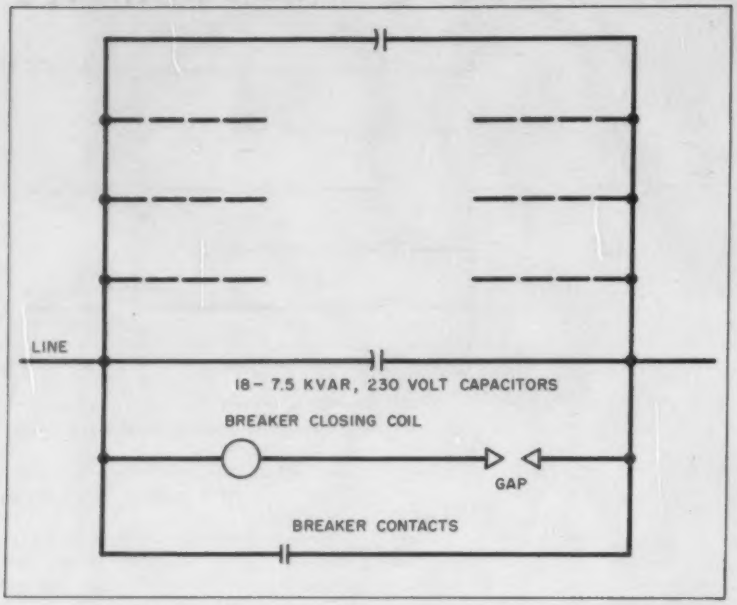


Fig. 3. Schematic of equipment used with capacitors on each phase at Point A

show the voltage variation to be less than one per cent at the 4160-volt bus. c. It was less costly than other schemes that only partly met the voltage requirements. d. It did not require that larger circuit breakers be installed.

Apparatus

Important details of the installation are shown in Fig. 3. The capacitor ratings were selected to provide, as nearly as possible, a flat voltage characteristic on the transformer secondaries. In other words, the capacitive reactance of the capacitor is made equal to the series leakage inductive reactance of the transformers.

The main bank at A, in Fig. 1, consisted of eighteen 230-volt, 7.5-kvar capacitor units and necessary protective equipment. The assembly was insulated for 5 kv and mounted in the steel cabinet shown in Fig. 4.

For protection against short circuits, a gap is connected in parallel with the capacitors. The gap, made up of two carbon electrodes in a sealed steel case, is pumped out to the proper vacuum for the desired breakdown voltage, 150 to 200 per cent of the capacitor rating. In case of a short-circuit on the load side of the capacitor the gap breaks down, shorting the capacitors. The gap breakdown is very fast, so that it operates before the current can reach a value much in excess of twice the capacitor rating.

After the gap has operated, the short-circuit current is limited by the power transformer impedance. Thus, the gap protects the capacitor from over-current and over-voltage, and also breakers against above-rating current.

A circuit breaker is also paralleled with the capacitors and the gap. When the gap breaks down, current through the breaker relay coil causes the breaker contacts to close, shunting the current around the gap and reducing the duty on the gap. In addition, it provides a convenient means of taking the capacitors out of service.

Individual fuses are provided on the capacitors to remove defective units. The capacitor units at B and C in Fig. 1 are identical. These units have only seven capacitors per phase as compared to 18 per phase at A in Fig. 1.

Results: The voltage fluctuation has been reduced to 4 per cent at the welding positions. The capacitors were designed to reduce the fluctuation to 7 or 8 per cent. It is believed that the latter figure is more nearly correct, and that the additional improvement is more apparent than real. Exact measurements require the use of an oscillograph and it is difficult to obtain an oscillogram that reflects the worst condition.

No trouble has been encountered with the starting of motors as has been the case in other installations where shunting resistors were not used on the capacitors.

Lamp flicker on the whole has been reduced. The lamp flicker on feeder circuits with series capacitors became more annoying because of the frequency of occurrence. The cause of the flicker was traced to a voltage disturbance of 3 or 4 volts (out of 120) occurring twelve times a second and lasting for about 3 seconds. A three-phase welding control on a seam welder was the immediate cause. Since no other apparatus was involved, the most economical solution was to reconnect the lighting transformer primaries to other circuits. The voltage fluctuation was less than a volt on the feeders not having series capacitors.

AIPE Luncheon—Host: Philadelphia Club

MEMBERS OF THE Philadelphia Plant Engineers' Club will be your host at the annual American Institute of Plant Engineers' Luncheon. The luncheon will be held on Tuesday, January 24, at Convention Hall, Philadelphia, at 11:30 a.m. on the second day of the Seventh National Plant Maintenance and Engineering Conference and Show.

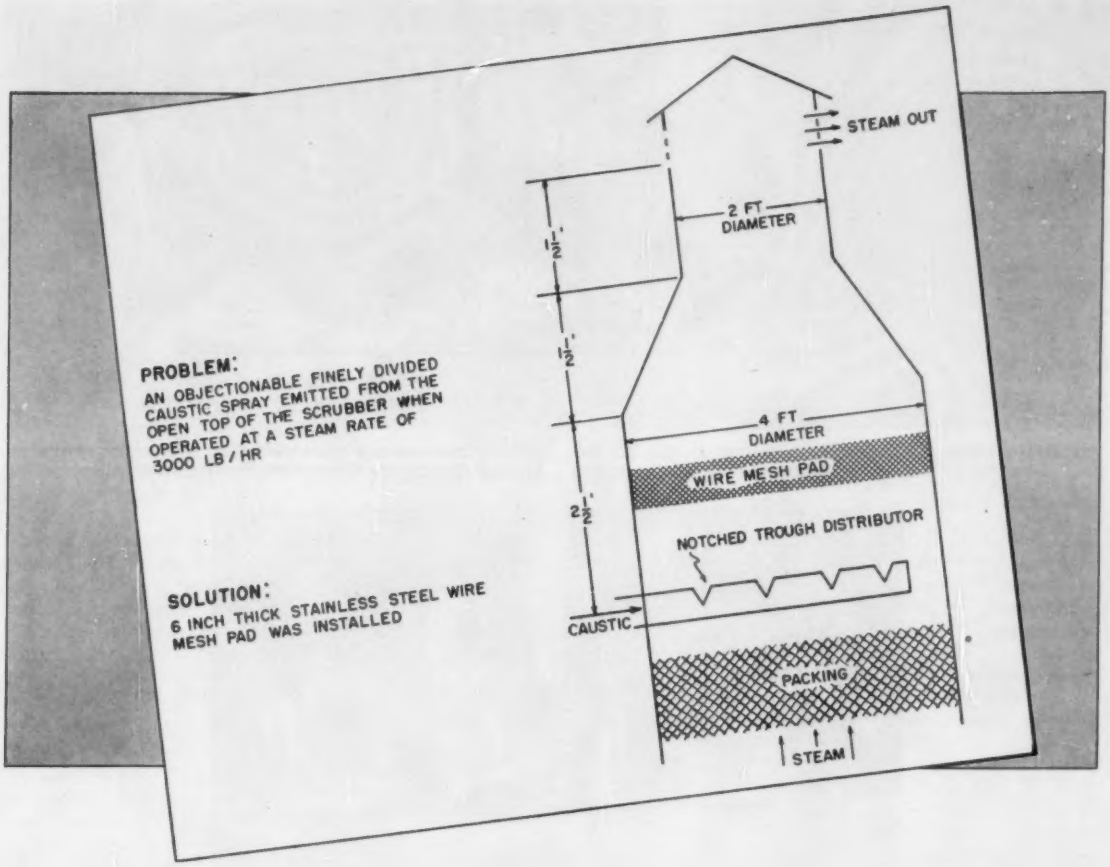
If you are planning to attend this luncheon and have not placed your reservation, will you kindly fill in the coupon below and mail it to Mr. Johnstonbaugh? The price for the meal is $6.00 per person and includes the cocktail hour preceding the luncheon.

Mr. Eugene G. Johnstonbaugh
United States Rubber Co.
Cottman and Keystone Sts.
Philadelphia 35, Pa.

I plan to attend the American Institute of Plant Engineers' luncheon to be held on Tuesday, January 24, at Convention Hall, Philadelphia. Please make a reservation for me.

☐ **I am a member of the _____ Plant Engineers' Society.**
☐ **I am not a member of a plant engineers' society, but I would like to see one organized in the city of _____**

_____ Name
_____ Company
_____ Title
_____ Company Address



Screen Confines Caustic Spray

Eliminates Objectionable Air Pollution Problem

HERE IS A case history telling how a hazardous air pollution problem was solved through the use of wire mesh pads fabricated to fit the existing equipment.

A major chemical company was confronted with an objectionable air pollution problem which resulted from a necessary step in their processing operations. They were scrubbing organic material from steam by circulating caustic solution over a packed column counter-current to the steam.

With a steam rate of 3,000 lb per hr it was noted that a finely divided caustic spray rose from the top of the column and spread out over the surrounding area. Many methods for eliminating the spray were suggested, but all involved the addition of relatively expensive equipment.

A decision was finally made to try wire mesh pads which are used a great deal in petroleum refining and chemical processing because of their ability to stop entrainment of liquids.

Based on the recommendations of the design engineers from the Otto H. York Co., a sectional type wire mesh demister was placed in the top of the 4 ft-diameter section of the tower, about a foot above the distributor. The 6 in.-thick demister pad was fabricated from stainless steel, type 304.

Before installation of the demister pad a series of qualitative tests had been conducted to determine the amount of caustic spray. Presence of the spray was revealed by the formation of red dots on phenolphthalein paper. To prevent fading of the red dots, the papers were preserved in paraffin.

By comparison of the color intensity of the papers, a rather accurate estimate of the caustic spraying was possible. For example, at the top of the tower the paper was completely red at the end of one minute with full sparge rate, whereas the paper was completely red at the end of 2½ minutes half of the full sparge rate.

After the installation of the wire mesh demister, these tests were again conducted. No evidence of red dots could be shown on phenolphthalein paper at the top of the tower within a period of ten minutes, even at the full sparge rate.

Would You Like Tear Sheets?

Readers wishing tear sheets of any article appearing in the issue for their personal file may obtain them by indicating the item desired on one of the post cards appearing in this issue.—Editors

Photograph shows the entire group present at this Maintenance Conference. This was the first meeting of the Armed services maintenance personnel with a recently appointed Civilian Consultants Committee. Meeting details appear below

Honorable Franklin G. Floete, third from left, presided at the Joint Civilian-Armed Services Maintenance Conference Luncheon held at the Pentagon

Civilians, Armed Services Join Forces on Maintenance Methods

MEN FROM industry, business publications, and members of the Armed Services were present recently at a Maintenance Conference luncheon held at the Pentagon.

The meeting was presided over by the Honorable Franklin G. Floete, Assistant Secretary of Defense, Properties and Installations. At his right in the lower picture, is Richard H. Morris, Editorial Director of PLANT ENGINEERING, President of the American Institute of Plant Engineers, and a civilian consultant for the Department of Defense.

At Mr. Floete's left is Oscar W. Graveley, Director of Maintenance in the Office of the Assistant Secretary of Defense. For many years he has served as plant engineer of Union Carbide and Carbon Co. and has been prominent on the past programs of the Plant Maintenance and Engineering Conferences. This year he will be the keynote speaker at the American Institute of Plant Engineers' Luncheon to be held in Philadelphia, Convention Hall, on Tuesday, January 24th, during the 1956 Conference. (If you haven't sent in your reservation, kindly fill in the coupon on page 114 of this issue).

This meeting at the Pentagon was the first get-together of the Armed Services maintenance personnel with a recently appointed Civilian Consultants Committee.

At the present time the committee consists of R. H. Morris, R. F. McCaw of National Broadcasting Company, W. C. Cooling of International Resistance Co. and F. W. Michal of *Factory* magazine.

In addition to H. W. Bordner and T. D. Culbertson of the Comptroller office, the three services were represented by the following: For the Army, General K. R. Barney, Colonels C. C. Haug and L. J. Ferony, Lt. Colonel E. W. Fischer and K. Turner; for the Navy, Captains E. J. Peltier and A. C. Husband, Commander H. N. Wallin, R. H. Proudman and T. A. Callaghan, Jr.; for the Air Force, Colonels D. F. Lehnhard and J. E. Gill, J. J. Rockefeller and G. E. Ramsey, Jr.

Plant Engineers' Societies Report On Their Activities

AS THE NUMBER of Plant Engineers' Societies increases so will their activities. Following is a brief report of what some of these Societies are doing:

Milwaukee

New officers for the 1955-1956 year for the Plant Engineers' Society of Greater Milwaukee, will be:

Russell Zarling, American Motors Corp., president; Ernest Nygren, Ben Hur Manufacturing Co., vice president; Joseph Jacques, Lakeside Laboratories, Inc., secretary; and Warren Lancaster, Robert A. Johnston Co., treasurer.

Board Members will be Fred Trubschaw, Galland-Henning Manufacturing Co., for two years; and E. N. Potter, International Harvester Co., will finish out the second year of his two-year term.

Niagara Frontier

Attendance at the fall meetings of the Plant Engineers' Society of the Niagara Frontier has been increasing steadily, thanks to the club's telephone committee. Their record crowd so far has been 33 members and guests.

Before each month's meeting a telephone committee gets busy and checks to see how many members can be expected at the next meeting. It has been very successful in boosting the attendance.

New York

Everett J. Hess, Curtiss-Wright Corp., will take over the duties of president of the Plant Engineers' Association of Metropolitan New York for the 1955-1956 year. He will be assisted by Homer F. Harman, E. I. du Pont de Nemours & Co., who will serve as secretary-treasurer.

Franklin McDermott, of Lever Brothers Co., will represent the Metropolitan New York Plant Engineers' Association at the January Convention of the American Institute of Plant Engineers in Philadelphia.

Northern Illinois

Election of officers was the first order at the December meeting of the Plant Engineers' Society of Northern Illinois.

Officers elected for the 1955-1956 year, are: L. T. Puzin, Chicago Hardware Foundry Co., president; A. F. Miller, Johns-Manville Corp., vice president; and K. Wells, Abbott Laboratories, secretary-treasurer.

Board Member-elect Bion Hutchins, United States Navy, will serve a two-year term and S. T. Christensen, Deepfreeze Appliance Div., Motor Products Corp., will be serving his second year as board member.

Northwestern Ohio

Members and guests of the Plant Engineers' Society of Northwestern Ohio, recently toured the facilities of Aro Equipment Corp.

The men who toured this plant and who appear in the photograph are identified below: seated left to right: J. Bella, Detroit-Toledo-Shoreline R.R.; M. Semancik, Aro Equipment Corp., R. H. Morris, President of American Institute of Plant Engineers; B. Williams, Libbey-Owens-Ford Glass Co.; M. C. Powell, Doehler-Jarvis Div. of National Lead Co.; R. Hacker and M. Williams, of Air-Way Industries, Inc.; and R. Blaine, General Mills Inc.

Second row, left to right: W. DeMars, Grace E. Smith Co.; R. Forrester, Surface Combustion Corp.; T. Ellis, Willys Motors Inc.; B. Wendt, Kuhlman Builders Supply Co.; L. Penegeot, National Supply Co.; and M. Stiglitz, Toledo Steel Tube Co.

Third row, left to right; H. Heindel, Schultz Die Casting Co.; A. W. Olson, Libbey-Owens-Ford Glass Co.; B. Hall, Dura Div., Detroit Harvester Corp.; H. Jost, Kimble Glass Co.; and R. MacArthur, Dura Div., Detroit Harvester Corp.

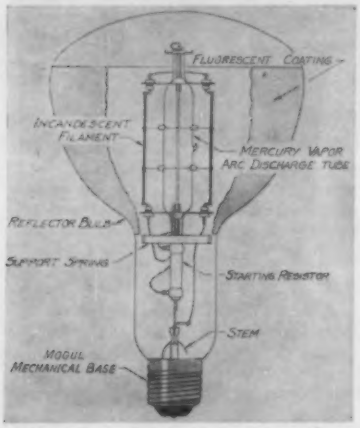
The president, R. H. Morris, and vice president, R. W. Hiller (Dravo Corp.) of the American Institute of Plant Engineers at Dravo shipyard, Pittsburgh

At a recent meeting, Plant Engineers' Society of Northwestern Ohio members and guests toured Aro Equipment Corp.

NEW DEVELOPMENTS

New Lamp Combines the Good Features of Three Light Sources

RECENTLY INTRODUCED by Duro-Test Corp., the Fluomeric combines advantages of modern incandescent, fluorescent and mercury vapor lamps. It emits lights in three ways: by gaseous discharge, as in quartz mercury vapor lamps; by fluorescing of activated phosphorous powders, as in a flourescent lamp; and by tungsten filament, as in an incandescent lamp.



Sectional drawing shows the Fluomeric's mercury vapor arc discharge tube, fluorescent coating and twin incandescent elements. The latter serve as both the radiation source and internal ballast

Although incorporating positive features of these light sources, the Fluomeric is claimed to eliminate the negative ones. Unlike fluorescent and mercury vapor lamps, this new one requires no transformer—it screws into an ordinary socket. And while like the incandescent lamp in this respect, it is announced as more durable and efficient, having an average efficiency of 25 lumens per watt. The color spectrum of the Fluomeric is also said to be superior—combining the yellow-red tone of the incandescent, and the blue-green of the mercury vapor with the flexibility of the fluorescent phosphors to produce a light with richer color, more nearly like that of sunlight.

Incorporated in the new lamp are twin incandescent filaments, a mercury vapor and discharge tube, and fluorescent coating. The filaments serve a dual function: as a source of radiation and as internal ballasts, enabling the Fluomeric to operate without an external transformer. According to Duro-Test, the new light source burns sixteen times longer than the standard incandescent lamp, and can be made in every size, shape, wattage and voltage. Production is scheduled to start this month and costs are reported comparable to those of mercury vapor lamps. High bay and outdoor lighting are among industrial applications expected for the Fluomeric. It is suggested for use in any areas where good lighting is important.

To obtain more data on this lamp, write, "Fluomeric" on the Reader Service Card, page 181. Or drop a line to Equipment Editor, PLANT ENGINEERING, 110 S. Dearborn, Chicago 3

Re-Designed Incandescent Lamp Furnishes up to 15 per cent More Light

GREATER LIGHT output without use of more electricity is announced for a line of improved incandescent lamps recently introduced by General Electric Co. This increased output has been accomplished by the following steps: improving the tungsten filament by means of basic design changes; altering the mount structure so the filament is positioned lengthwise; and substituting coiled coil filaments for singly coiled ones in the lamps of 300 w and larger.

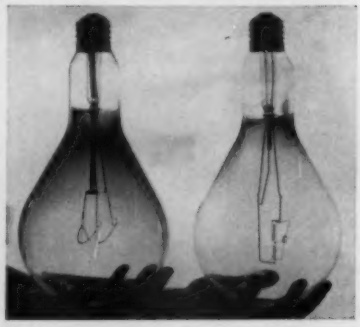
Brighter light without higher lamp or electricity costs is enjoyed at GE's own plant in Erie, Pa., first to receive the improved incandescent lamp

As a result of these changes GE reports that the new lamps have increased light output ranging up to 15 per cent for the higher wattage bulbs. The 750 w bulb, for example, produces an average of 21.6 lumens per watt, as compared with an efficiency 18.9 lumens for the present 750 w bulbs. Both 750- and 1000-w bulbs in the new lamps are immediately available in 750- and 1000-w sizes—those offering the greatest benefits. Other sizes in these improved lamps are scheduled for production within the next few years.

Axial positioning, the most dramatic visual change in the improved lamps, does two things to step up light output: it lets the filament burn at higher temperatures without shortening its operating life, and it causes bulb blackening to concentrate in a smaller area, and thus permits more of the light to get out.

For further details, write, "GE Lamp" on Reader Service Card, page 181

Burned the same period of time, the improved lamp at right shows smaller area of blackening due to axial positioning of the coiled coil filament



AND APPLICATIONS

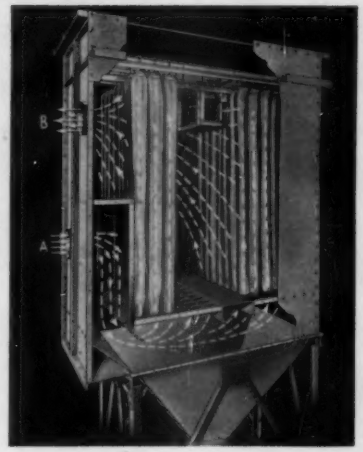
Filtration Process Provides Super Cleaning of Atmospheric Air

SUPER CLEANING of atmospheric air with industrial-type filtration equipment is the function of Ultra-filtration, a process developed by Wheelabrator Corp. Its advantages are said to lie in extremely high cleaning efficiency, moderate cost, and low maintenance.

Ultra-filtration employs this company's conventional industrial Dustubes, dust collectors of the tubular cloth filter type. Briefly, the process involves charging of the filter bags with a filter aid which precoats the filtering surfaces and provides a matrix upon which the fine particles of atmospheric dust and tarry matters are collected. One application of filter aid is expected to last from two or three years under normal conditions. Only maintenance required is that of shaking the spent filter aid and accumulated dust from the filter bags, says Wheelabrator, and the only maintenance costs are those involved in the cleaning and recharging of the collector. Cost of the equipment is said to compare favorably with conventional devices having cleaning efficiencies 30 per cent less.

Ultra-filtration is not intended as a replacement for usual filtration equipment used in controlling usual industrial dust problems—but it offers high—reported over 99 per cent—efficiency in the cleaning of ordinary atmospheric air. Its applications include the ventilation, pressurizing and cooling of enclosures in which heat generating electrical equipment is used, as well as the direct cooling by pressurizing of housings or enclosures of electrical motors, switchgear and controls. It is suggested for the ventilation with, or without, associated air conditioning, of areas requiring dust-free atmospheres.

For more information on this process, just write, "Ultra-filtration" on the handy Reader Service Card on page 181



Arrows show air-flow direction in this Ultra-filtration dust collector. The filter aid coats the insides of the cloth filter bags—some of which are omitted in this drawing for clarity

Flexible Pipe Insulation Zips in Place and Goes Around the Bends

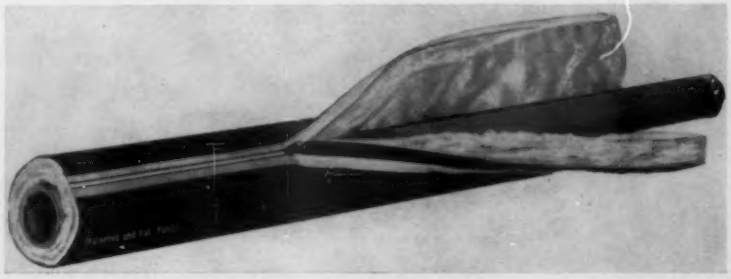
ZIPPER FITTED for easy installation, this flexible tubing and pipe insulation consists of Fiberglas Aerocor and a tough plastic vapor jacket. A development of Miracle Adhesives Corp., the product—called Protekto-Flex—will be distributed by Owens-Corning Fiberglas Corp. to supplement its own line of industrial insulations.

Although primarily designed for air conditioning applications, Protekto-Flex has a broad range of insulating possibilities. Intended for use on copper pipes carrying chilled, cold and hot water, it may also be used for high velocity ducts, steam traced lines and group piping. It is available for copper tubing sizes ½ to 4⅛ in. OD. Temperature limits of Protekto-Flex are 32 to 350 F, manufacturer announces; it is fire-safe, and is resistant to sunlight, acids, alkalies, corrosive salts, oils and greases, as well as bacteria and fungi, plant and animal acids, fresh and salt water.

Special advantages of Protekto-Flex are its ease of handling and flexibility. Standard 50-ft reels (longer lengths may be had, too) are packaged in compact dispensing cartons. You cut off the length needed, apply it to the pipe and fasten with the Flexi-Grip closure. Protecto-Flex adjusts itself to the bends in the piping, passes over sweated couplings, even takes a 90-deg turn. And the zipper closure serves to provide a water-tight, air-tight and moisture-vapor seal. Protekto-Flex is available in black, gray, white, and gray-green colors. Other colors and special sizes may be ordered.

You may use the Reader Service Card provided on page 181 to learn more about this insulation. Just write, "Protekto-Flex" at bottom of the card

Zipper closure makes Protekto-Flex easy to apply on pipe and tubing. It lends itself to other cylindrical shapes too, adjusts to bends, takes 90-deg turns



The Gamma Camera—

RADIOGRAPHIC WORK involves taking pictures through materials that range from thin-walled pipe to castings 8-in. thick. To meet such varying demands, our company has designed and is using several different types of gamma cameras.

A gamma camera is basically a block of heavy metal (lead or a tungsten alloy) in which a radioactive isotope can be stored and conveyed safely. For use, the camera is opened to permit the gamma rays to emerge. The gamma rays are often confined to a sharply-defined beam, the shape of which depends upon the nature and location of the object to be radiographed. Remote operation is a feature of a number of these cameras.

Following are descriptions of six of these cameras, each different in its function.

• • •

General Purpose Camera—This is the camera most used by field radiographers in our company. It is a compact 40-lb unit capable of handling seven curies of iridium 192. A lever at one side of the camera opens a step-construction lead door to let the gamma rays emerge in a 90-deg beam. The iridium source can also be protruded through this camera for panoramic exposures. The general purpose camera is used for "shooting" welded seams on pressure vessels, for radiography of storage tanks and structural steel. It can "pinch hit" for any inspection job—piping, castings—in fact, anything up to 2½ in. limit or iridium radiography.

• • •

Pipeline Camera—This is the most widely used type of pipeline camera, operating from outside the pipe. On any size pipe from 4 in. to 36 in. it will "shoot" approximately half the circumference of the weld in each exposure. The camera is easily portable and can be clamped in any position on the pipe by chains. It holds five curies of iridium 192.

The pipeline camera operates by a rotary motion which brings the radioactive source into close proximity with one side of the weld. It is operated remotely by a 4-ft flexible cable.

• • •

Penstock Camera—Iridium 192 is used for penstock weld inspection too. Here a major requirement is for a light camera that can be supported centrally in the 12 ft to 20 ft penstock sections. The camera can be sup-

This is the pipeline gamma camera in action. It operates by a rotary motion which brings the radioactive source into proximity with the weld. Can be used on 4 in. to 36 in. pipe

Essentially a portable X-ray camera, the gamma camera now permits taking non-destructive test and inspection equipment to the site . . . Installations that formerly could not be examined are now sitting ducks for these six new cameras — you can shoot them on-the-spot

Newest Atomic Seeing-Eye for Industry

By E. G. FRITZ, General Manager, Isotope Products, Inc., Houston

ported on a tripod stand or, in the sloping section of the penstock, it can be supported from the welding spiders. It is remotely operated on a 10-ft flexible cord and uses a shuttle action.

One very important factor in this type of work is that welding is often going on fairly near the seam being radiographed. This means that the radiation has to be confined to a thin 360 deg fan beam just covering one circumferential weld. Due to the lack of scattered radiation from iridium gamma rays, adjacent locations are quite safe from radiation.

• • •

Foundry Camera—In radiographing materials up to the equivalent of 2½ in. of steel, iridium produces the most satisfactory radiographs. Beyond that thickness however, iridium rays will not penetrate and the more energetic rays of cobalt 60 have to be used. With this isotope more lead shielding is necessary, and cameras are not as portable.

The foundry camera was devised as a simple tool for casting inspection. It handles one or two curies of cobalt and weighs 300 lb. It can be wheeled from place to place and is arranged to produce either beamed or panoramic exposures.

Spot Camera—This, by contrast, is the "baby" of Isotope Products' tools. It weighs a little under 20 lb and handles about one curie of iridium. It is so light that it can easily be suspended by using a magnet.

Formerly storage tank welding was tested destructively, by the removal of trepan plugs. This was a hit-and-miss method, which in addition led to serious danger from cracks when plugs were welded back. Now the spot camera provides small radiographs to replace the old-fashioned methods.

• • •

Projection Camera—The latest camera to be devised by Isotope Products is the most versatile and elaborate yet constructed. It is for radiography of the largest castings, and will handle up to a fifty curie source of cobalt 60. It consists of three units: a control cabinet, a castle, and a stand: each 20 ft from the other and joined by flexible conduit.

At the touch of a switch on the control cabinet, the source is protruded from the castle. It moves down the flexible conduit, coming to rest in a finger at the end of the stand. A second switch on an automatic timer sends the source back. Safety features and lights indicating the source position at any time are all provided at the control cabinet.

A lever—here shown on opposite side of general purpose gamma camera—opens a door to let the gamma rays emerge

Plant Moves to the Suburbs

Finds "Elbow Room" for New Production Ideas

MODERNIZATION, expansion and increased efficiency were the motivating factors behind the move of Templeton, Kenly and Company from Chicago to suburban Broadview, Illinois. One of the major improvements for this manufacturer of Simplex lever, screw and hydraulic jacks came about with the availability of sufficient floor space for assembly line layout. Flow of parts, materials and assemblies was greatly simplified when the additional floor space permitted layout of the production lines for straight line flow—a decided advantage over the "backtracking" necessary in the old plant.

Carefully planned use of the 96,000 sq ft of floor space resulted in production area layout that facilitates flow of materials from loading dock to shipping dock in a U-shaped line. From rail and truck receiving docks, raw materials are delivered first to sizing operations and then to general machining. Service operations such as heat treating, grinding, welding and spray painting are placed either in the center of the U or at its outer edges.

A mezzanine storage area, where machined parts are placed for storage prior to further processing, adds 7480 sq ft of available floor space.

With future expansion in mind, the plant was designed for the easy addition of 38,080 sq ft of floor area. One side was constructed with the roof, wall, flooring, service piping and wiring arranged so that it can be easily extended with a minimum of structural change. See Fig. 2.

To offset a potential fire hazard, the paint spray room and the heat treating room are isolated from the remainder of the plant areas. The paint spray room, although located in the interior of the production line, is completely enclosed in a masonry-walled room, with fire doors at entrance and exit. The electrical circuits are explosion-proof, and the room is fitted with sprinklers and an alarm system.

The heat treating facility, located on the periphery of the production line, is in a less hazardous location relative to the production areas, but it is still "sealed off" from the remainder of the building. These two precautions were largely responsible for an 85.8 per cent reduction in fire insurance rates formerly paid by Templeton, Kenly.

Arrangement of monorail and bridge crane runways has been designed to facilitate the unloading of trucks at the receiving dock and storing their loads of pipe, bar stock and casting in appropriate areas without intermediate handling. The load stays on the crane from the time it is picked off the truck until it is lowered into storage racks.

An ingenious interlock in the controls of the units supplying heat to the loading dock area helps keep dock workers protected from winter drafts. Limit switches mounted on the column between the two outer doors are actuated by lugs on the doors. When one or both of the doors is opened, the switch turns on the unit heaters located above the dock. These heaters are directed outward toward the door openings, so they create a counterdraft that keeps the cold air from reaching the working platform. The doors themselves are controlled by switches on the dock, as are the two hydraulic-power adjustable dock ramps which can be adjusted to suit any truck height.

During the various machining processes involved in the production of Simplex jack line, a considerable amount of metal shavings, turnings and chips accumulate. Since the comparatively small size of the operation does not warrant fully automatic chip removal, with its attendent conveyors, screens and filters, a simple manual system has been applied successfully. The machines are cleaned during the working day by a laborer using a shovel and wheelbarrow to remove the metal scrap from each machine. Each wheelbarrow load is placed into one of four Roura self-dumping hoppers located adjacent to the major machining areas. When a hopper is full, a lift truck moves it outside the plant to an area at the end of the railroad loading dock, where a local scrap dealer keeps a Dempster Dumpster hopper spotted. The self-dumping hoppers are emptied into the larger hopper, as in Fig 5. At regular intervals, the dealer brings in his truck, drops an empty hopper, removes the full one.

Faced with the almost universal industrial problem of water supply, Templeton, Kenly installed two Binks "package" cooling towers to reclaim the water used in the plant's air compressor and heat treating oil coolers. The company estimates that installation of the towers resulted in an 85 per cent reduction of water requirements for the two specific operations, and a 50 per cent reduction in overall plant water consumption. Dollarwise, the water usage reduction resulted in an approximate saving of $60.00 per month on water charges.

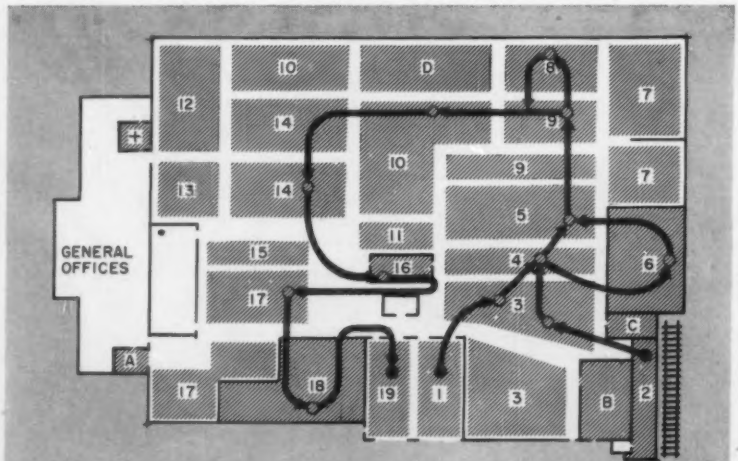


Fig. 1. Layout of plant, with parts flow during mechanical jack assembly shown. Some sub-assembly operations have been omitted from basically U-shaped line

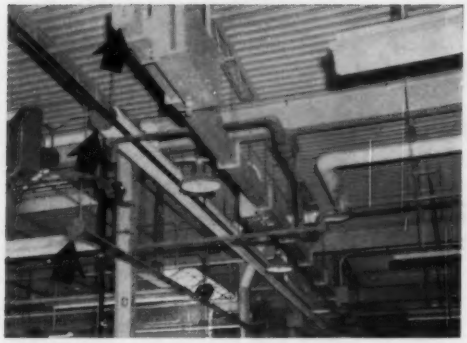


Fig. 2. Service lines are "blanked off" here, available for future expansion

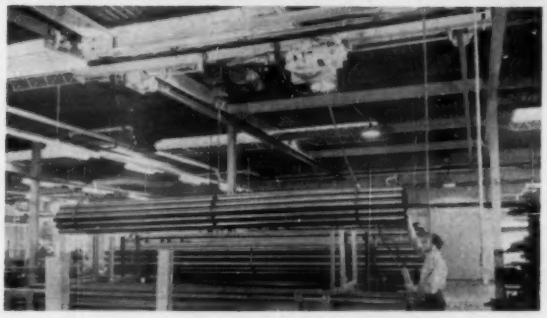


Fig. 3, above right, shows loading dock end of monorail and bridge crane system; Fig. 4, right, shows storage rack where pipe is moved direct from truck

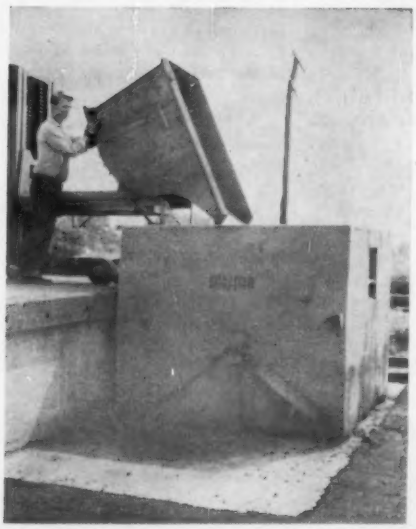


Fig. 5. Self-dumping hopper load of metal scrap is dumped into carrier for pickup

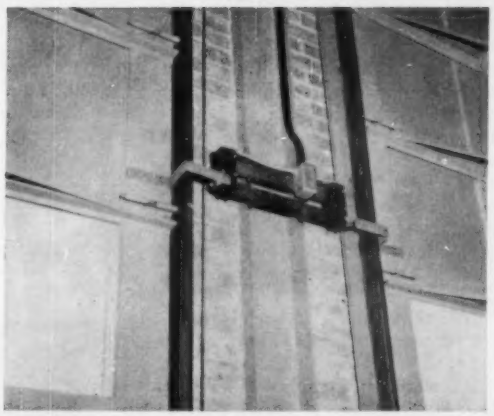


Fig. 6. Limit switches mounted on column between two outer doors of inside truck dock control unit heaters

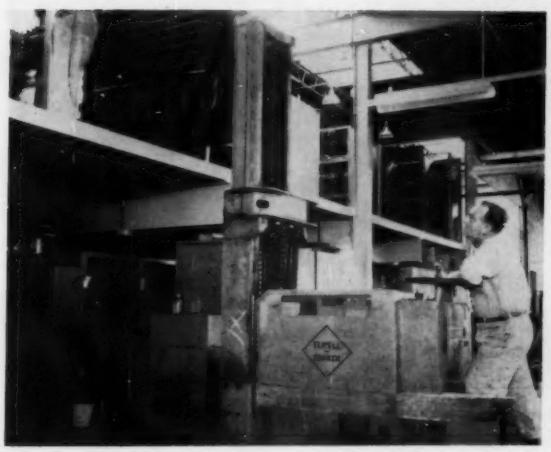


Fig. 7, left, illustrates ease of loading sub-assemblies onto mezzanine for storage. Quick-detaching pipe rails make access simple. Fig. 8, above, line of drill presses speeds drilling operations by eliminating excessive handling during processing

Proper Lubrication Practice

Extends Life of Machine Tools, Reduces Maintenance

Scheduling lubrication is an important step... Also, observing oil levels and using care when hand oiling or greasing... Lubrication of hydraulic systems is also discussed

MODERN MACHINE TOOLS are produced with meticulous craftsmanship. It is, therefore, essential to operational accuracy and proper maintenance that lubrication be done carefully, according to schedule.

If lubrication is not on a scheduled basis it is wise to contact a reliable oil company to make a machine survey and recommend systematic lubrication practices. Once such recommendations have been made as to the proper grades and types of oil and grease and schedules set up, it will be sound maintenance practice, from an economic point of view, to follow the schedules.

Servicing New Machine Tool

Before a new machine tool is put into operation all lubrication points should be serviced properly. This is important because lack of lubrication can cause damage in a very few minutes. When shipping turret lathes, for example, it is common practice for the manufacturer to fill the reservoirs, headstocks, the aprons, as well as the traverse box, to the high level mark with the correct lubricant.

After the machine has been in operation for approximately 30 days or 250 hours, all reservoirs should be drained and flushed, preferably with light, clean flushing oil and then refilled to the proper level with the correct grade of lubricant. This practice will prove highly beneficial because it serves to remove all wear and service debris before the oil becomes sufficiently contaminated to destroy initial lubricating value.

The levels in all reservoirs should be checked at least twice each week or every 25 hours of operation. On the oil gage for each part will be found "high" and "low" level marks. Never permit the level to fall below the "low" mark, because damage may result from lack of lubricant. On the other hand, no good purpose will be served by over-filling or raising the level above the "high" mark. In fact, this practice will cause heat from churning and waste of oil by leakage.

Always stop the machine when checking oil levels. This will give all the oil distributed throughout the unit an opportunity to settle so that a true reading of the oil level may be obtained. If this is not done, the reservoirs may be over-filled resulting in the difficulties mentioned.

After 1000 hours, the oil reservoirs should be drained and refilled with fresh lubricant. This practice is most important because lubricant gradually suffers a loss in properties as a result of continued service and contamination with impurities. It is a questionable economy to lengthen the period of use, because increased maintenance may offset the savings several times over.

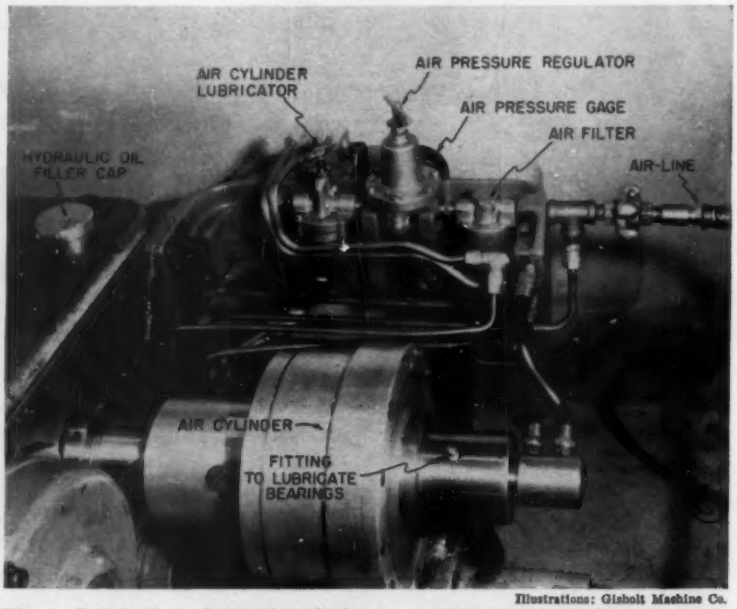
High quality lubricants should always be specified for use in machine tools. Cheap or low-grade products will require more frequent renewal to assure dependable lubrication. Their use will prove ultimately more expensive when all factors are taken into consideration.

It is possible to reclaim drained oil and use it again although this practice usually will not result in a cost saving unless large quantities of oil are involved. Furthermore, the reclaiming methods employed must be correctly adapted to the condition of the used oil in order to obtain the desired result. Ordinarily it is simply best to discard the old oil or use it for some purpose not requiring a high degree of purity.

At the beginning of each eight-hour shift or as needed all oil cups should be given a few drops of machine oil. It is helpful to paint the oil cups a bright color so they may be easily located. For hand-oiling purposes, a can that delivers a measured amount on each shot is recommended in place of the ordinary spring bottom type of can.

Where pressure fittings are installed to introduce oil, a pressure gun of the proper type should be used for applying the lubricant. Under no circumstance should grease ever be used on fittings intended for oil.

The main point to keep in mind on the use of the oil can and oil gun is that regular dosage at the suggested intervals and in the correct quantity is better than larger quantities at longer or irregular intervals. When too much



Illustrations: Gisholt Machine Co.

Fig. 1. Lubrication of the air cylinder on an air-operated chucking device is essential. Some of the lubrication points requiring attention are indicated

oil is applied, and particularly in the case of fittings, the excess simply goes to waste and the parts may become dry if the interval is prolonged.

On machines equipped with air-operated chucking devices, lubrication of the air cylinder is essential. Such machines make use of small lubricators which should be kept full with a light machine oil of high quality.

In the use of grease on a machine tool, a cardinal rule is never to apply grease where oil is recommended. If grease is used where oil is indicated on the lubrication schedule, impaired operation of the machine may be experienced and even injury to the parts involved. Therefore, the operator should be fully versed in the needs of each machine.

On Applying Grease

Grease guns sometimes become air-bound, particularly after refilling and will not eject the lubricant in the usual manner. It is good practice to work the gun a few times to make certain all air has been released.

Grease should be applied sparingly to anti-friction bearings. Furthermore, on bearings where the grease has no avenue of escape, never force in the lubricant by exerting high pressure because this may overfill the bearing and make it run hot. It may also damage the seals and permit the entrance of impurities.

Most efficient operation of the hydraulic system depends largely upon (1) use of the right oil, and (2) proper service attention or care of the system. Hydraulic systems require mineral oil of high quality, suitably refined, to stand up in hydraulic service. Light viscosity of body is necessary except in the headstocks of some automatic turret lathes.

The oil must have a high chemical stability, must not vaporize when subjected to sudden pressure changes, should release entrained air rapidly so as to eliminate foaming, and must readily separate from water. In addition, the oil must remain fluid at lower temperatures, and should not thin out excessively at high temperatures. It should also have good lubricating qualities in order to protect pumps and rams from excessive wear.

In a carefully worked out lubrication schedule, intervals should be indicated for checking the level of oil in hydraulic systems and for making oil changes. These intervals should be followed closely for best results. Extreme care should be exercised so that no grit, dirt, water or other contaminants are permitted to enter the system. A small concentration of solid matter can cause the pump to stop or burn out. Keeping the strainer clean on the pump intake is very important. This should be cleaned regularly after every 250 hours of operation.

Oil leaks may become a source of trouble not only because oil is wasted and lost but also because escaped oil may allow air to enter the system. If this occurs operation may become erratic and smoothness noticeably impaired. Therefore, careful observation should be maintained for oil leaks in the piping and suitable repairs made.

Oil temperatures may also have a significant bearing on proper functioning of a hydraulic system. If continued abnormal development of heat occurs and the system is not overloaded, it is an obvious indication that something is wrong. While some heat in the system is entirely normal and permissible, should temperature of the oil rise above 140 F an immediate search should be made for the cause. High oil temperature is dangerous in two ways, (1) it thins the oil so that rapid wear may occur and (2) it promotes oxidation of the lubricant and formation of sludge or oxidized portions which may disrupt the operation of valves and retard volume of flow.

Importance of Cleanliness

Clean machines and the practice of cleanliness in all lubrication procedures are important supplements to the proper oiling methods. Contamination in practically any form tends to defeat the very purpose of the lubricant. How to minimize this condition and maintain a high standard of cleanliness is largely a matter of care and good judgment on the part of the operator and personnel in charge of oiling. However, certain specific suggestions can be offered as follows:

Lubricant containers should be stored in a clean, isolated room and not on the shop floor or adjacent to the machine. Containers and dispensing equipment should be kept tightly closed when not in use and should be clearly marked to avoid use of the wrong grade.

When adding oil to the headstock, aprons or hydraulic system, the filler opening should be wiped clean so that impurities have no chance to enter. In the case of the hydraulic system or speed selector unit, it is best to pour the oil through a fine mesh screen or strainer. All covers, filler plugs, etc., should be replaced properly and securely immediately after oil has been added. Pressure fittings should be cleaned off before the oil or grease gun is applied. A rag or other absorbent material is preferred to cotton or wool laced for cleaning because of the possibility of lint or ravellings entering the oil when waste is used.

The most important fact to keep in mind is that price per gallon or per pound of the lubricant does not provide a true index to the broad cost of lubrication. Premature wear or failure of bearings, gears or hydraulic pumps due to ineffective lubrication or deterioration of the lubricant itself can offset many times in cost the savings in expense for oil and grease.

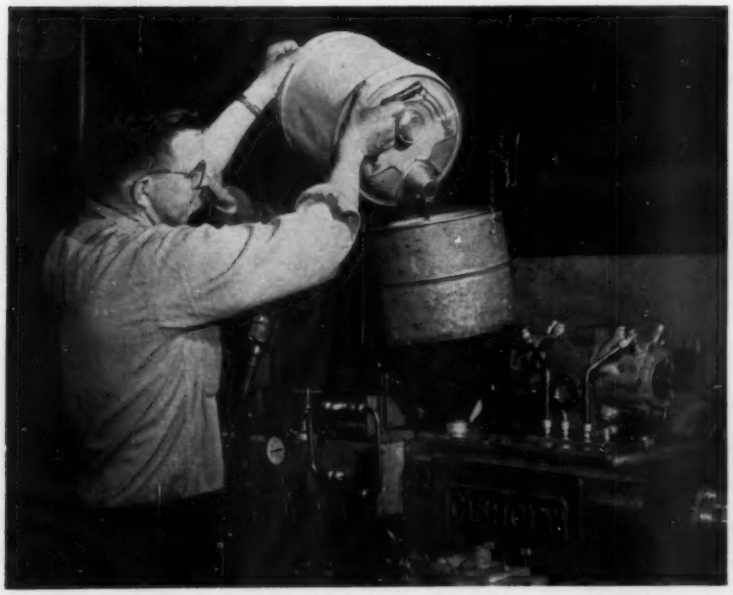


Fig. 2. Operator pours hydraulic oil into headstock of lathe. Filters on the oil spout, in the funnel and inside the oil filter cap trap any foreign material

Industry's New Magnetic Midgets

Count and Measure Variety of Industrial Operations

TWO NEW MAGNETIC counting and measuring instruments are helping industry on its production, processing and packaging lines.

The manufacturer states that the heart of these two instruments is the Ferristor which promises continuous and trouble-free service for five years, performing most of the functions formerly handled by vacuum tubes. Essentially a tiny magnetic amplifier, with redesigned circuitry for increased speed and reduced size, the Ferristor utilizes the electromagnetic principle to create a new concept in industrial instrumentation.

First of the new magnetic instruments is a dual preset controller capable of counting at rates to 10,000 counts per second, and producing output signals at each of two presettable count totals. Input count pulses may be obtained from photocells, magnetic pickups, electrical contacts, etc. Output signal through built-in relay, rated at 5 amps, operates solenoids, power relays or other control devices. The first signal may be used to slow down operations preparatory to stopping at second, or final, preset count total.

Some of the industrial applications suggested by the manufacturer of this counting device include precise control of batching, weighing, counting, sorting and packaging equipment, cutting sheet or strip stock to length, machine or process control, sequencing, and a number of other industrial operations.

Measuring Instrument

The second magnetic instrument measures events occurring during 0.1, 1 or 10-second intervals. Operating from a photocell, magnetic pickup or any suitable transducer, the instrument gages pressure, temperature, flow, viscosity, frequency, revolutions per minute or counts events or objects at rates to 40,000 counts per second.

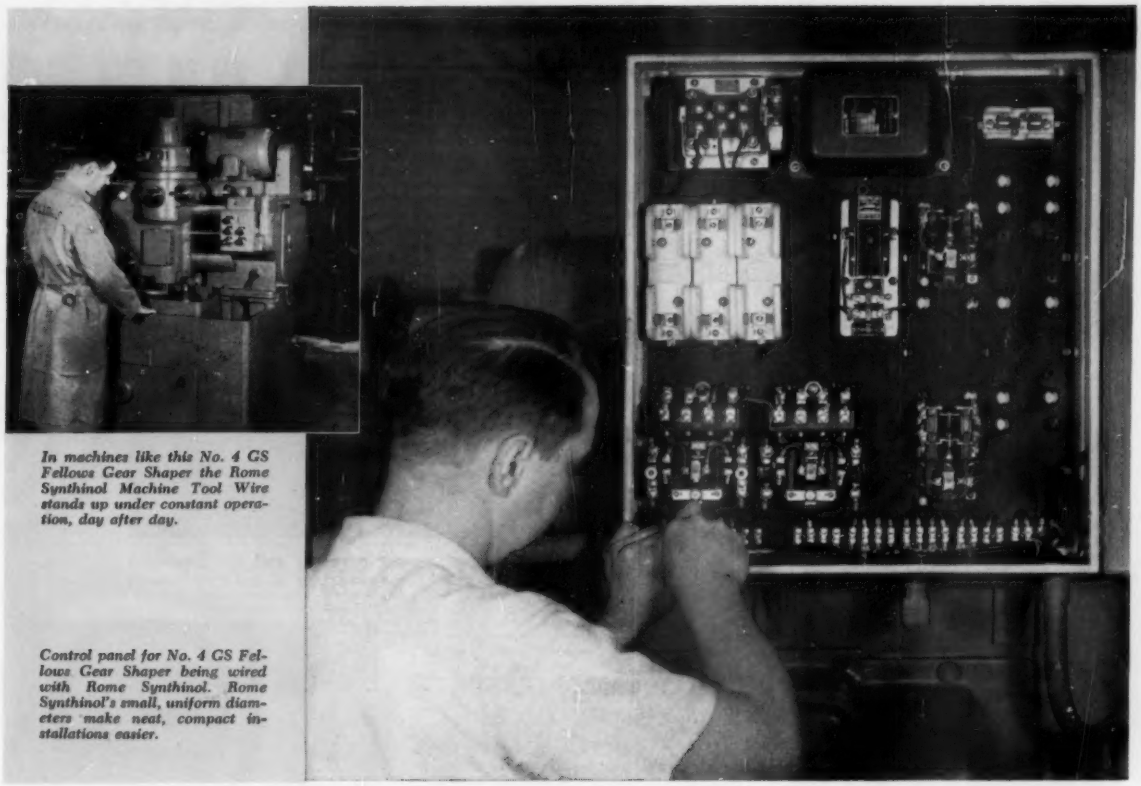
Specific applications of the measuring instrument include use in aircraft or automotive piston or jet engine test cells, on dynamometer test stands, with laboratory or production tachometry systems, process control systems and data reduction systems. It is also recommended for hydraulic and pneumatic servo testing, acceleration determination, measuring linear or centrifugal speeds, forces, strains, also for measuring any optical, electrical, mechanical or physical events occurring during a precise time interval.

There are only two vacuum tubes in the new magnetic preset controller versus 54 in the former electronic model and only three tubes in the measuring unit versus 35 in the former electronic model of the meter. This reduction in vacuum tubes eliminates heat dissipation problems, permitting sturdy dust-tight enclosures for the new instruments. Simplified circuitry and design permits installation, servicing and operation by regular plant personnel.

Want More Information?

If you would like additional information about these products, either write The Editor, Plant Engineering, 110 South Dearborn St., Chicago 3, Illinois, or indicate "Magnetic Midgets" on the bottom of the postage-paid cards elsewhere in this issue.

Swing-out chassis construction simplifies the installation, inspection and servicing of the magnetic counter and measuring instruments



In machines like this No. 4 GS Fellows Gear Shaper the Rome Synthinol Machine Tool Wire stands up under constant operation, day after day.

Control panel for No. 4 GS Fellows Gear Shaper being wired with Rome Synthinol. Rome Synthinol's small, uniform diameters make neat, compact installations easier.

A job made easier by the right control wire

The electrical engineering department at Fellows Gear Shaper Company, of Springfield, Vt., looked long and carefully before they finally selected the thermoplastic control wire for their gear cutting and finishing machines.

They chose Rome Synthinol® Machine Tool Wire for these Fellows machines. Exhaustive tests, supplemented by experience, showed that Rome Synthinol is easy to work with —thoroughly reliable under continuous operating conditions—and *consistently* high in quality.

Uniformly small diameters give Fellows (and you) a wire that saves space. Flexibility, ease of stripping, and uniform wall thickness of the insulation all speed installation—contribute to ease of maintenance. **Oil resistant**—since many Fellows machines go to automotive plants, the inherent resistance to oils and cutting solutions of Rome Synthinol is important (meets J.I.C. codes).

Also, Rome Synthinol carries U/L approval as Type TW, with end use approval for 80° C. in air, 60° C. exposed to oil or in wet locations and conforms to standards of National Machine Tool Builders Association.

The exceptional resistance of this thermoplastic compound to high ambient temperatures, corrosion, oils and chemicals suits it for a variety of machine applications. And Rome's high quality control standards assure you of top performance, always.

Available in permanently clear colors, with solid or spiral markings, Rome Synthinol is an asset to equipment manufacturer and user alike. Test it for yourself.

It Costs Less to Buy the Best

ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

For more facts circle 568 on Reply Card

Fig. 1. Cart is tilted so chips and oil can be raked into chip wringer basket

Fig. 2. Operator lowers basket of chips and oil into chip wringer, where centrifugal force separates oil for reclamation

Chip Wringers
Salvage Valuable Cutting Oil

RECOVERY of valuable cutting oil from tons of metal chips and shavings is a daily function at The Singer Manufacturing Company in Elizabethport, N. J. With an average day's production resulting in the use of 3000 to 3500 gallons of cutting oil, its recovery is a most important phase of the machining operations.

Singer has installed two 48-in. diameter Tolhurst chip wringers to process the chips from their machines.

Chips are collected from the machines in three-wheeled carts, each with a capacity of 36 cu ft, or about 1800 lb of chips and oil.

From the carts, the chips are dumped into one of the two chip wringers. After they are centrifuged to remove the oil clinging to them, the dry chips are dumped from the centrifuge basket into a chute, which leads down through the floor to a railroad gondola car, spotted to receive and eventually remove the scrap metal.

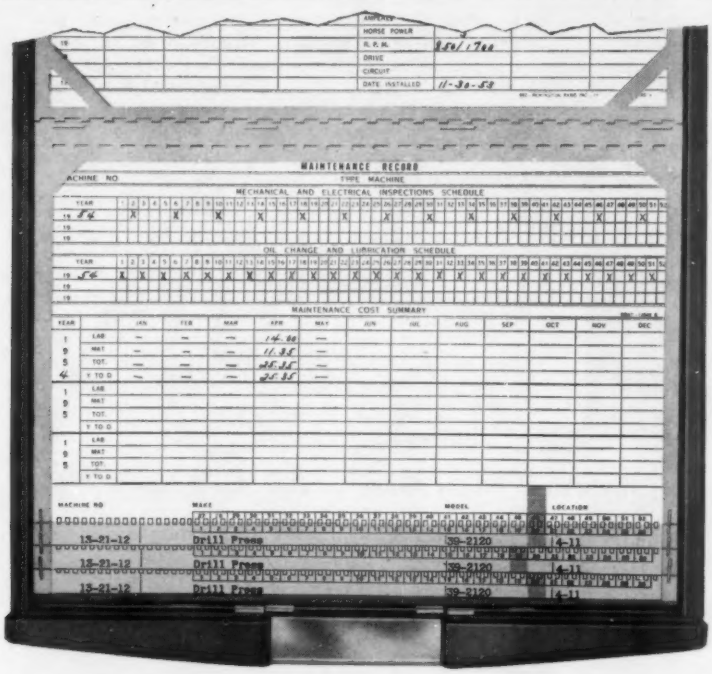
Little or no drainage of the chips takes place prior to their being transported to the centrifuges, so a rather large amount of cutting oil is handled. Each cycle of the centrifuge produces about 75 gal of oil for re-use.

The salvaged oil flows from the centrifuge into a temporary storage pan, and is then pumped into a wheeled tank. The tank, and others like it, are moved through the machining areas, replacing the cutting oil at each machine where it is needed.

Fig. 3. Salvaged oil flows from wringer outlet into tank for temporary storage

Fig. 4. After centrifuging, the wringer basket of "dried" chips is removed from the chip wringer for disposal as scrap

Fig. 5. Basket of chips is hoisted over chute for dumping into railroad car



Integrated Preventive Maintenance Program Protects Capital Investment, Cuts Down-time and Product Costs

A well-integrated Preventive Maintenance Program will include: Equipment Records, Maintenance Parts Control, Written Work Orders, Work Scheduling and Executive Reports.

A Kardex Equipment Record (partially illustrated above) gives a complete machine history, at a glance. This record includes a history of depreciation, mechanical and electrical inspections, oil change and lubrication, plus a *maintenance cost summary* to aid management decisions on machine replacement or retirement.

Written Work Orders are essential for planning job assignments and for correct cost accounting. They alert maintenance executives to all conditions affecting work to be performed, put an end to the errors and misunderstandings that result from verbal orders.

Your *integrated* system will aid in the preparation of Executive Reports. Here, visibly-signalled Kardex records have proved to be most efficient. More details on this phase, and on the entire Maintenance Control System, are yours in booklet X1383, offered in the coupon.

Tight Maintenance Parts Control Helps Reduce Inventory Investment, Production Stoppage, Overtime

With tight control over parts and supplies, scheduled maintenance and necessary repairs are expedited; production stoppage and overtime are held to a minimum. Maintenance parts records should list available balances on hand, usage and trend of usage, vendors, date and quantity of last order. Effective control includes a numbering system to eliminate duplicate items, cut inventory investment. Kardex Visible records, with movable Graph-A-Matic signals, save time by focusing attention on items nearing reorder point. See booklet X1383.

For more facts circle 569 on Reply Card

Remington Rand Maintenance Control Systems Featured at Plant Maintenance Show!

Be sure to visit the Remington Rand Display of Maintenance Control Systems at the Plant Maintenance Show in Philadelphia Convention Hall, January 23 through January 26, 1956. You'll find us in Booths 1348 and 1352.

Visiting these booths then is the quickest and most practical way you have of acquainting yourself with *all* the latest and most effective Maintenance Control Systems yet developed. In a matter of minutes, you will be able to familiarize yourself with methods that can save you untold hours of valuable production time. You will find collected in this one display all the systems and procedures necessary for the all-inclusive production maintenance program that is best suited to *your* particular needs.

If for some reason you are unable to attend the convention, the same comprehensive information available there may still be obtained by contacting your nearest Remington Rand Office or indicating your interest on the coupon below. Remember this: keeping in touch with the latest methods of productive maintenance is the surest way of keeping on top with profits!

Remington Rand

DIVISION OF SPERRY RAND CORPORATION

Room 1196, 315 Fourth Ave., New York 10

Yes, I would like to have Booklet X1383 ☐*; to be made acquainted with the latest Maintenance Control Systems* ☐.

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1-28

Profit-Building **IDEAS** For Business

Insulation Plays Big Part in Fuel Economy at Huge Steam Generating Plants

Two STEAM-ELECTRIC generating plants, being built at a total cost of $325 million, are going up at Madison, Indiana and Cheshire, Ohio, along the Ohio River. When completed, they will furnish power for the Atomic Energy Commission's diffusion plant near Portsmouth, Ohio.

Extensive use of thermal insulation will help make these two facilities the most economical and efficient power generating stations in the country. Believed to be the largest single insulation contract ever placed, the plants will expend $4 million for insulation alone. Fiberglas and Kaylo insulations, both supplied by Owens-Corning Fiberglas Corporation, are being applied on pipes, breechings, boilers and ducts to conserve heat and protect operating personnel. One individual installation features aluminum jackets over Kaylo insulation on the hanger rods supporting one of the boilers.

Each of the eleven 215,000-kw turbo-generating units in the overall project is cross-compound in design, operating off a single boiler. Steam entering the high pressure side of the unit is superheated to 1,050F and reheated to the same temperature before entering the low pressure side. Pressure at the high side inlet is 2000 psi.

Together, the two new plants will be capable of generating 2,365,000 kilowatts of power for the AEC installation they serve.

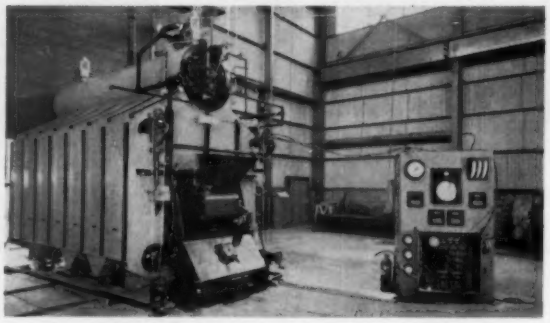
Specified by the Navy, Designed by Industry, Boiler Goes to the Air Force

CULMINATING A LENGTHY PROGRAM of small boiler development with several industrial boiler designers and manufacturers, the U. S. Navy's Bureau of Yards and Docks drew up specifications for a low cost, dual-fuel (coal plus oil and/or gas) water tube packaged boiler.

Two design contracts were awarded—one to Superior Combustion for a range of capacities from 10,000 to 22,500 lb per hr, and one to Foster Wheeler for a range of capacities from 25,000 to 45,000 lb per hr.

The first unit completed and tested, one of the smaller units built by Superior Combustion, will go to the Air Force Base at Klamath Falls, Oregon.

Fired by a Riley stoker, the unit is rated at 12,500 lb per hr, and can be converted to oil firing in less than 60 hr. This conversion time was a specification of the Navy, to make the unit subject to "weekend conversion". It is expected that the unit as designed, with a Buell dust collector, Sturtevant fans and Rimcor combustion controls, will cost less than $3.00 per pound of capacity.



Cleanliness Plays Top Role in Assembly of Aircraft Accessory Turbines

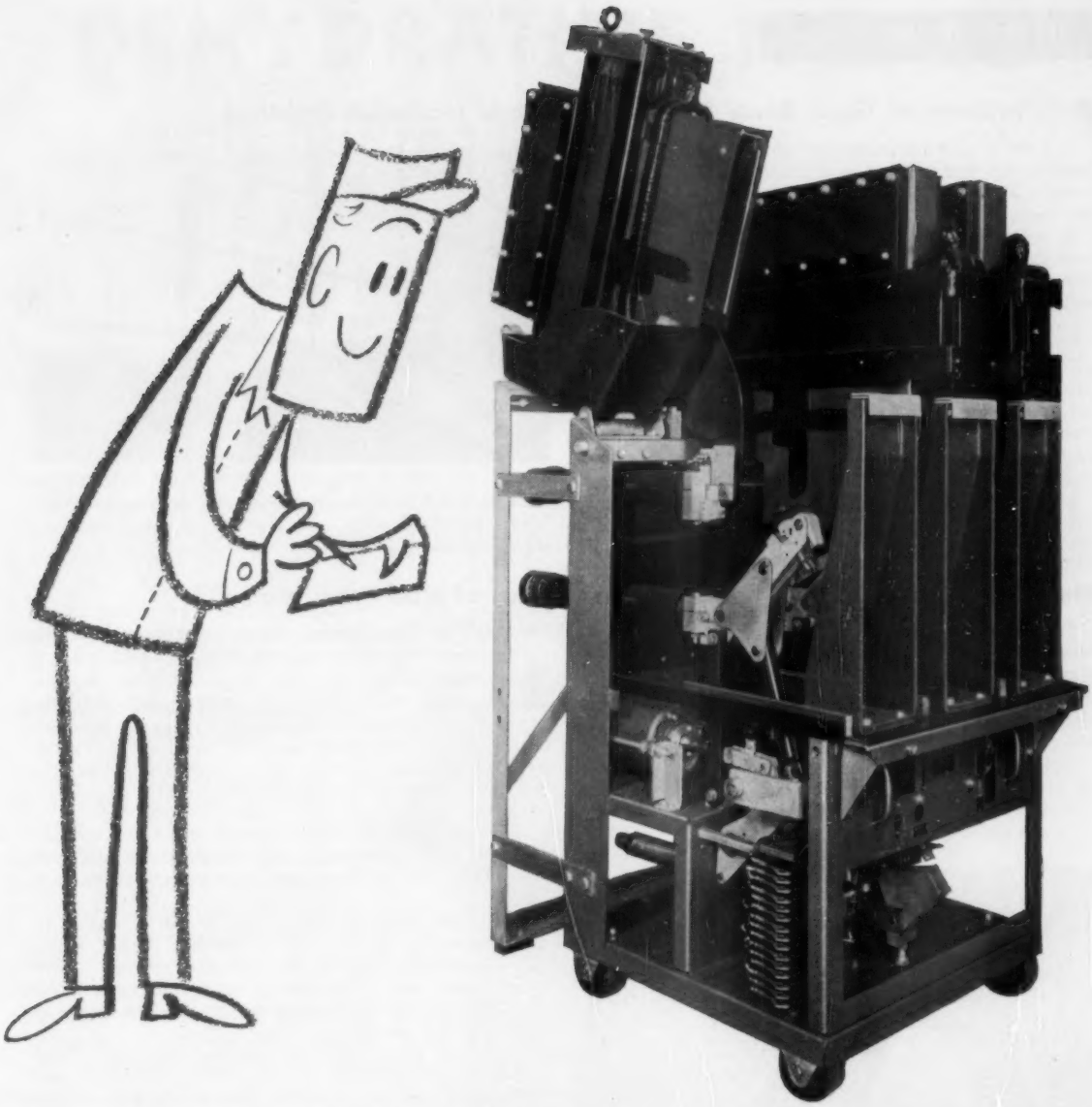
The assembly area of the General Electric Company's Aircraft Accessory Turbine Department offers serious competition to even the plant hospital, when cleanliness is considered.

This extreme cleanliness is essential because the aircraft accessory turbines which are made in the area are sealed after assembly, and any dirt left inside these power packages could rub against the finely machined inner mechanism, affecting their operation.

These turbines supply the vital auxiliary power for a jet plane's lighting, radar, landing gear, bomb-bay doors and associated equipment.

Each part of an accessory turbine is carefully inspected for even slight specks of dust and if found "clean," it is sealed in dustproof polyethylene bags. The part is then put on an assembly board with other packaged parts and the entire assembly is covered with a polyethylene sheet, ready to enter the assembly area proper.

Cheesecloth filters, which are changed every week, cover oversize air vents serving the assembly area, as extra protection against dust. Sweeping in the area is prohibited, as is filing and machining. Cleaning is done by vacuum only.



SEE VALUE HERE YOU'LL SEE NOWHERE ELSE

Operating engineers in the electrical industry often say you can see the higher quality in I-T-E switchgear even when you stand 'way back.

Of course, they're only partly right. You can easily see the practical component arrangement, the all-welded steel construction with compartments designed to retain shape even when lifted as a unit, and the clean, neat appearance. These are standard on all I-T-E switchgear.

But we want you to look closer—see even more. For example, in Metal-Clad Switchgear: the easy-to-service horizontal drawout design; the tilting arc chutes; the extra-heavy insulation. There's quality in every detail—quality that means dollars' more value for your switchgear investment and years' longer troublefree service.

Why not phone the I-T-E office nearest you. Or write for bulletin 7004 giving a complete description of 5, 7.5 and 15 kv switchgear, I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Phila. 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY • Switchgear Division

For more facts circle 570 on Reply Card

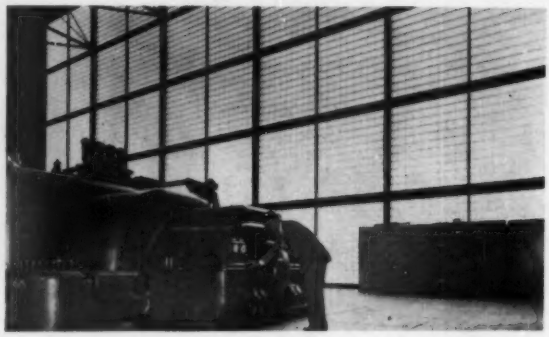
Wall Sections of Glass Block Solve Lighting and Insulation Problems

A POTENTIALLY TROUBLESOME lighting and maintenance problem has been solved at Philadelphia Electric's new Cromby Station with the use of glass blocks in major wall sections.

In designing the window system, glass block panels were used to give optimum lighting combined with high insulation value; eliminate sash replacement; and reduce the window maintenance caused by storm damage, rust, and corrosion.

Glass blocks form the entire north and south walls of the huge room that houses the two generating units. Over 11,000 light-diffusing glass blocks, product of the Pittsburgh Corning Corporation, are set in structural steel framework at each end of the generator room. The room itself measures 200 ft by 120 ft and the glass blocks extend upward for 61 ft of the total 78 ft of wall height.

In addition to the glass block wall having the insulating value of an 8-in. masonry wall, the built-in light diffusing features of the blocks prevent blinding glare that would have resulted from such an expanse of glass in conventional lights. River reflections were given prime consideration as a possible source of glare into the building.



New Research Laboratory for Solving Problems of Steel Production

LOCATED ON A FIVE-ACRE TRACT overlooking their Pittsburgh, Pennsylvania works, the Jones & Laughlin Steel Corp. has constructed their newest research laboratory. Built at a cost of over $1,500,000, the laboratory contains the most modern equipment for handling the research problems of a steel company.

The laboratory has a total floor area of about 40,000 sq ft. It consists of a one-story office building and a two-story laboratory building with basement joined at the first floors by a one-story corridor. Both buildings are equipped with complete year-round heating and air-conditioning systems. Construction of the laboratory began in July, 1954.

Equipment includes that for physical testing, metallographic studies, x-ray diffraction, spectrographic analysis, and analytical chemistry. Investigative programs cover all phases of J&L's operations from raw materials processing, iron and steelmaking, production of finished steel products, organic chemical processing, and development of new instruments for automation and quality control.

The laboratory also houses the administrative activities of the Research Division; a 3,500-volume library; accounting and purchasing offices, and a fully-equipped machine shop.

In the laboratory building, special movable metal partitions have been provided for subdividing various areas. All the utilities—gas; air; hot, cold and chilled and distilled water; a-c and d-c wiring—are run in racks inside the partitions and can be repaired or added to simply by removing face panels.

Numerous safety features have been installed. These include safety showers at exit doors in the laboratories and a concealed steel door which, in case of fire, separates the laboratory from the office area.

Man-Size Pilot Plant Provides Westinghouse with Near-Production Facilities

DESIGNED TO FUNCTION between laboratory and commercial production of new alloys and processes, a metals pilot plant has been constructed by the Westinghouse Electric Corporation at Blairsville, Penna.

Included in the plant equipment is an 18,000-lb and three smaller forge hammers; a 1000-ton steam-hydraulic forge press; seven forge furnaces; three induction melting furnaces ranging in size up to 5000 lb; a cold hearth furnace; a reversing hot rolling mill; a reversing cold rolling mill; bell type and roller rail box type electric furnaces; a shot pouring facility; shell mold and lost wax investment casting facilities; arc furnaces; and related equipment.

High on the list of development projects for the new lab facilities is the development of alloys for applications in gas and steam turbines. Magnetic alloys are also to be studied, as are expansion alloys for use where an airtight seal between glass and metal is required.

With 173,000 sq ft of floor space available, the lab is designed to process both wrought and cast alloys, and has equipment large enough and flexible enough to permit actual manufacturing conditions.

DEHYDRATINE NO. 22

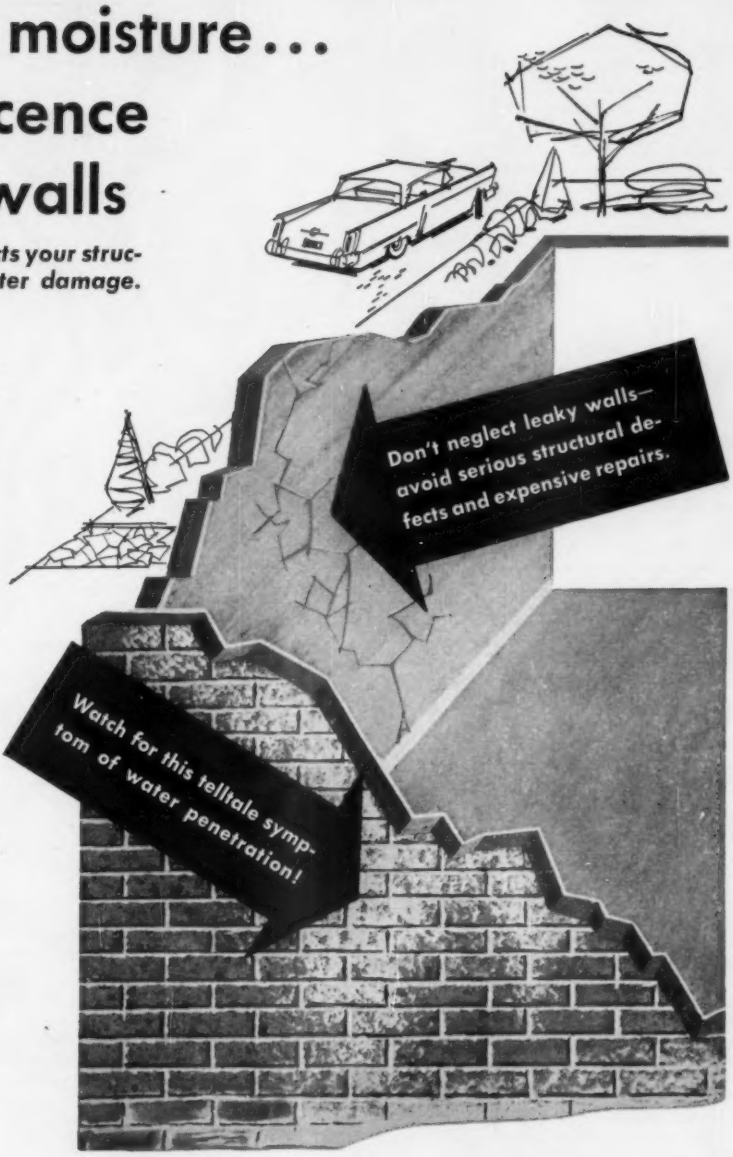
seals out moisture... stops efflorescence on masonry walls

Silicone base water repellent protects your structures from inside and outside water damage.

Dehydratine No. 22 is no ordinary "surface" repellent. It functions on the principle of "negative capillarity" *in depth.* The highly penetrating characteristics of Dehydratine No. 22 set up a valve-like action within the masonry that permits vapor to escape *outward,* but stops the capillary absorption of solid drops of moisture from passing inward.

Dehydratine No. 22 reduces soiling and discoloration

Dirt and soluble stains cannot enter the pores of masonry treated with Dehydratine No. 22. Thus foreign particles trapped on the surface are readily washed off by rain. Owners and operators of concrete or light-colored stone buildings find that this saves money by eliminating difficult and expensive cleaning operations. Since Dehydratine No. 22 is effective against "white bloom" or efflorescence, it preserves the original beauty of the exterior without changing the color or texture of the surface. It pays to protect your structures against *inside* and *outside* water damage with Dehydratine No. 22.


Don't neglect leaky walls—avoid serious structural defects and expensive repairs.
Watch for this telltale symptom of water penetration!

A Subsidiary of Sun *Chemical Corporation*

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DIVISIONS OF SUN CHEMICAL CORPORATION

HORN • **HUDSON** • **WILLEY** (paints, maintenance and construction materials, industrial coatings) • **WARWICK** (textile and industrial chemicals) • **WARWICK WAX** (refiners of specialty waxes) • **RUTHERFORD** (lithographic equipment) • **SUN SUPPLY** (lithographic supplies) • **GENERAL PRINTING INK** (Sigmund Ullman • Fuchs & Lang • Eagle • American • Kelly • Chemical Color & Supply Inks) • **MORRILL** (news inks) • and **ELECTRO-TECHNICAL PRODUCTS** (coatings and plastics)

For more facts circle 571 on Reply Card

NEW PLANT CONSTRUCTION — advance information on location, costs

Aliceville, Ala.—F. C. Huyck & Sons, papermakers, felts, mechanical cloth, bed blankets, and industrial cloth, has recently taken an option on a 200 acre plant site on which it plans to construct a modern one-story 200,000 sq ft mill. Cost of new construction not announced but expected to be in excess of $2 million.

Bessemer, Ala.—Pullman-Standard Car Manufacturing Co., a wholly owned subsidiary of Pullman, Inc., 79 East Adams St., Chicago, Ill., has authorized plans for expansion of its freight car manufacturing plant here. Addition of 100,000 sq ft of manufacturing area will be completed by early 1956. Cost reported in excess of $1 million.

Boron, Calif. — Pacific Coast Borax Co., division of Borax Consolidated, Ltd., New York, N. Y., has authorized plans for an $18 million expansion program to construct new concentrating and refining plants at Boron. New facilities are scheduled to begin operation by mid-1957.

East Hartford, Conn. — United Aircraft Corp., Pratt & Witney Aircraft Division, has announced an expansion program to double manufacturing capacity of its North Haven plant. Turner Construction Co., New York, N. Y., is general contractor. Cost of addition is expected to exceed $4 million.

Newington, Conn. — Fafnir Bearing Co., 39 Booth St., New Britain, Conn., has authorized plans for the erection of a new plant for the machining and heat treating operations on a 100-acre site. The one-story structure, of steel and concrete, will have a floor area of 152,000 sq ft. Plant is scheduled for completion late in 1956 and is reported to represent a $1.5 million investment.

Jacksonville, Florida — The Simmons Co., 1870 Merchandise Mart Plaza, Chicago, Ill., have plans under way for the construction of a large one-story bedding plant, reported to cost in excess of $2 million. It is expected to be in production by late summer of 1956.

Jessup, Ga.—Rayonier, Inc., chemical cellulose, 161 E. 42nd Street, New York, N. Y., will soon begin construction of a second chemical cellulose plant here. New mill will be completed and in operation by late 1957, and will cost an estimated $25 million.

Whiting, Ind.—Standard Oil Co. (Indiana) has plans under consideration for the construction of a new ultraforming unit at its refinery here. New unit will supplement fixed-bed hydroformer which employs a molybdena catalyst and will have a capacity of 14,000 bbl per day.

Des Moines, Iowa — Penn-Dixie Cement Corp., 60 E. 42nd Street, New York, N. Y., has authorized expansion plans and work is now under way at the West Des Moines, Iowa, plant to increase facilities and production. Expansion of plant and additional equipment will represent an investment of $4.5 million.

Louisville, Ky.—General Electric Co., Schenectady, N. Y., has plans maturing for the construction of new plant for the manufacture of room air-conditioners at Appliance Park, here. Ground will be broken soon and plant is expected to be in full operation by summer of 1957. Cost when completed to exceed $5 million.

Louisville, Ky. — Stauffer Chemical Co., 382 Madison Avenue, New York 17, N. Y., has plans under way for new plant adjacent to company's present plant. New plant will produce carbon tetrachloride, a refrigerant; chloroform; methylene chloride, an industrial solvent; and anhydrous hydrogen chloride, an ingredient used in the production of synthetic rubber. Construction is scheduled for early next year with completion in 1957. Cost estimated between $2 and $5 million.

Flint, Mich.—A-C Spark Plug Division of General Motors Corp., have announced plans for the construction of a new manufacturing plant at local plant site, this city. Construction of plant will begin soon. The new plant is expected to be ready for full operation late in 1956. Cost reported to be in excess of $3 million.

Ypsilanti, Mich.—Ford Motor Co., Dearborn, Mich., has authorized plans for the construction of a new 600,000 sq ft automobile parts manufacturing plant four miles southeast of here. Present parts and equipment manufacturing divisions located at Manchester and Milford, both in the state, will be closed and their activities moved to new location, to be known as the Rawsonville plant. Expansion will cost in excess of $5 million with equipment.

Harrison, N. J.—Nopco Chemical Co., Inc., Lewis & Carter Sts., has authorized plans and work is scheduled to begin next month on a new three-story 15,000 sq ft pilot plant adjacent to present facilities. Company manufactures sulfonated and emulsifiable oils, synthetic organic chemicals and foam plastics. Engineers, Inc., Newark, N. J., is consulting engineer. Cost reported in excess of $500,000.

Linden, N. J. — General Aniline and Film Corp., dyestuffs and intermediates, 435 Hudson St., New York, N. Y., has authorized plans and work is already under way on the New York Metropolitan area's first chlor-alkali plant. Plant will use water, salt and electric power as its basic raw materials. It will have a capacity of 50 tons a day of chlorine, caustic soda and other chemicals for use in company's manufacturing facilities at Rensselaer, N. Y., and Linden, N. J. Plant, when completed, will represent an investment of $5 million. Blaw-Knox Co., Chemical Plants Div., engineer.

Massena, N. Y.—The Aluminum Company of America, 1200 Alcoa Bldg., Pittsburgh, Pa., has authorized plans and work is already under way for expansion at company's wire plant at local site. Cost of plant expansion and equipment estimated to cost in excess of $1.7 million.

Canton, Ohio — The Timken Roller Bearing Co., has announced a multimillion dollar expansion and modernization program of plant facilities through 1956. A budget of $7 million has been established for the project. An additional budget of approximately $5 million has been set aside for the production of railroad bearings.

Cleveland, Ohio — Jones & Laughlin Steel Corp., 462 Gateway Center, Pittsburgh, Pa., has announced an expansion program of $115 million to increase steel making capacity by more than 700,000 ingot tons, at its Cleveland and Aliquippa plants. Completion of both plants is expected by 1957.

Dayton, Ohio—The Airtemp Division of Chrysler Corp., 1600 Webster Avenue, has announced plans for plant and equipment expansion program exceeding $2 million. Included in the program is a $1.5 million production line with equipment, for the manufacture of car air-conditioning compressors.

Logan, Ohio—Carborundum Co., Niagara Falls, N. Y., has recently announced plans for construction of a new plant near here for the manufacture of abrasive wheels. Construction will start immediately with completion scheduled for late 1956. No estimate of cost announced but reported to be a multi-million dollar project.

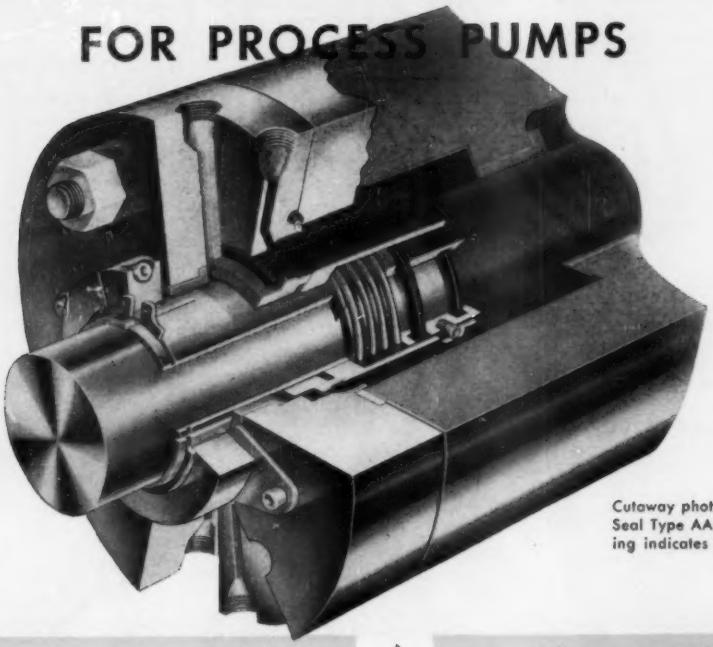
Monessen, Pa.—Pittsburgh Steel Co., Grant Building, Pittsburgh, Pa., has announced plans for a new building and improvement program. The program will be worked and completed at intervals starting May 1, 1956 and ending March 1957. Project to exceed $15 million.

Fort Worth, Texas—Menasco Manufacturing Co., 805 South Fernando Blvd., Burbank, Calif., has authorized plans and work is already under way on the construction of a new $5 million aircraft plant. Plant will have a manufacturing floor area of 100,000 sq ft. Completion is scheduled for 1956.

NEW from GARLOCK...

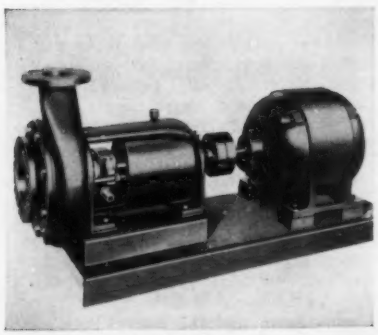
MECHANIPAK* SEALS

FOR PROCESS PUMPS



Cutaway photo of Garlock Unitary Seal Type AA51B-23. Yellow shading indicates liquid being sealed.

- One Piece Assembly
- Quick, easy installation
- Pre-set at factory
- Maintenance-free life



Typical chemical pump for which Garlock Unitary Seals are designed.

SAVE installation time, eliminate maintenance costs with Garlock's new Unitary Mechanipak Seals for process pumps!

The entire unit, including sleeve and gland, is furnished completely assembled. The seal is pre-set at the factory—no on-the-job adjustments are needed. The *external* lock and drive is readily accessible—eliminates set-screw drive.

Get all the facts today! Phone your Garlock representative or write for new Folder AD-151.

The Garlock Packing Company, Palmyra, New York

Sales Offices and Warehouses: Baltimore, Birmingham, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, Los Angeles, New Orleans, New York City, Palmyra (N. Y.), Philadelphia, Pittsburgh, Portland (Oregon), Salt Lake City, San Francisco, St. Louis, Seattle, Spokane, Tulsa.

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK

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For more facts circle 572 on Reply Card

NEW PRODUCTS AND PROCESSES summarized for your convenience

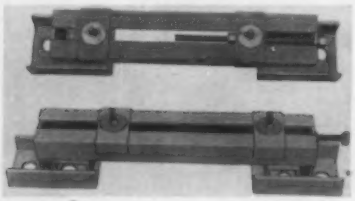
Edited by M. E. Heniken

1—FLOOR SURFACING is non-porous and rugged

Metal-Flex will form a nonporous, dust-free, and corrosion resistant floor, it is announced, extending the life of the floor indefinitely. Due to extremely low porosity, destructive materials are held on the surface assuring a long lasting floor surface and easy cleaning. It withstands rapid changes in temperature and is oil and grease resistant. Material is said not to wear or dust. It is applied to new concrete as soon as water has disappeared. The amount of conductivity and nonsparking, type and kind of traffic, and presence of corrosive liquids determines quantity to use. Flexrock Co.

2—MOTOR ISOLATION BASE with built-in slide

The Duplex Slide-Rail Motor Base is described as a high efficiency, vibration-and-noise-isolating unit featuring a slide mechanism that provides speedy belt tensioning, simple installation and versatility of application. Besides making unnecessary the use of separate isolation bases



and slide bases, this unit offers other design advantages. Its twin angle-iron construction affords structural rigidity and the built-in slide rail feature permits adjustment of motor for rapid equipment installation. It also lets the slide mechanism be located within the base, rather than on top of it, so there is no addition to the height of the unit or any protruding parts. Full adjustability and the use of individual rails enable the same isolation base to be used with a broad range of motor sizes—29 motor sizes can be accommodated with only six standard bases. Pictured above are top (showing slide) and side views of a rail. Two rails are a set. The Korfund Co., Inc.

3—PRESSURE GAGE shows available air pressure

This 2 in. diam gage for determining available air pressure at point of use is finished in chrome and comes equipped with a BD-20 hypodermic needle and guard. It permits tapping the air hose at the tool, thus determining pressure available at the tool regardless of original pressure or the number of tools on the line. U. S. Gauge Div., American Machine and Metals, Inc.

Use the Reader Service Cards provided on pages 181-182 to ask for more information on these products. Circle item numbers of products in which you are interested.

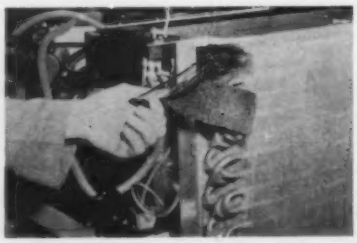
4—INDUSTRIAL TRUCK with automatic gear shift

Built in capacities from 3000 to 8000 lb inclusive, the KGA51 series of industrial trucks is equipped with torque transmission which provides automatic gear shifting. Since torque multiplies in infinitely varying ratios, transmission automatically puts truck in most suitable ratio relative to load and speed, it is explained, thereby eliminating engine lugging. To prevent transmission overheating, manufacturer has provided a large oil reservoir, run oil lines through an auxiliary radiator and applied fins to the lines.

Oil cooled, oversize, duplex type, hydraulically operated clutches are used for directional changes. Necessary oil pressure for torque transmission is supplied by pump. For maintenance purposes, transmission unit can be removed from truck without disassembly and clutch discs can be replaced without removing major components. Trucks are equipped with inching control, dual brake pedals, and easily accessible controls. Extra visibility is provided by a lowered cowl. The Yale & Towne Mfg. Co.

5—INSULATION WRAP for cold pipes, goes on fast

Kwikwrap is a beveled-edge insulation wrap for preventing condensation drip from cold pipes. It comes in 30-ft rolls, in $\frac{3}{8}$- and $\frac{1}{4}$-in. thicknesses and widths to accommodate different pipe circumferences. A feature of Kwikwrap is its shape and method of application to the pipe. The 30-ft strip of Kwikwrap is cross cut each 24 in. so it can be separated in 2-ft lengths for easy application. It is held along the length of pipe on the underside and then pressed up and around; the self-sealing beveled edges are pressed together to form an all-around uniform covering. The next strip is



butted up against the first, and so on.

The Kwikwrap way eliminates slitting, slipping and cementing, it is claimed, and is ideal where application space is limited. It is announced as able to withstand pipe temperatures from -20 to 200 F. Presstite Engineering Co.

6—CONDUCTORS for use with all makes of cranes

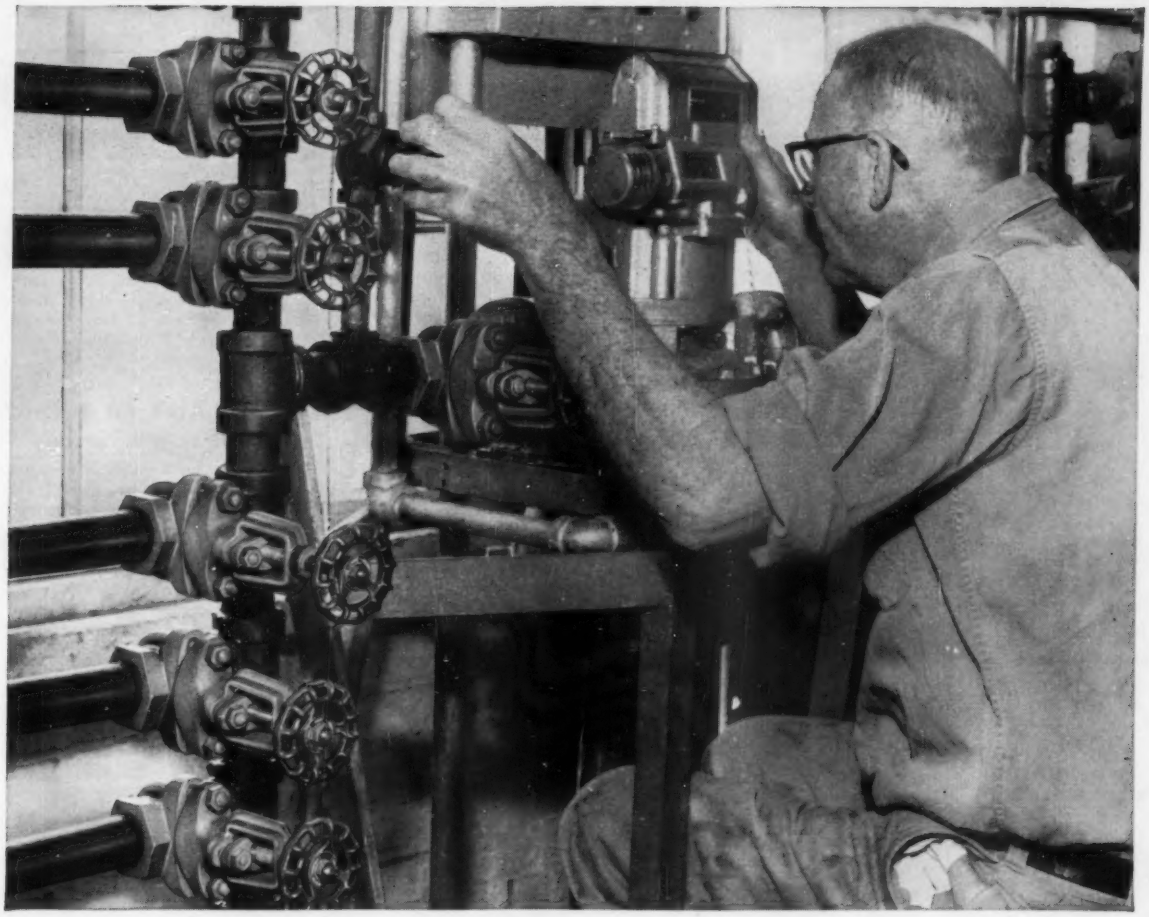
Aluminum Inverted-Y Conductors with sliding shoe collectors engineered to handle heavy current requirements of overhead traveling cranes are available in 300-, 500-, and 1000-amp and larger sizes. Heavy aluminum extrusions, these conductors may be side- or overhead

mounted to crane girders or runways by hangers made to let the conductors "float." This obviates need of expansion joints and eliminates strain on insulators, says manufacturer.

The conductors are heavily built for use in steel mills, foundries, cement mills and other hard-duty applications. They have a counterweight which maintains constant pressure of the sliding shoes to assure uninterrupted current flow. It is noted that because of pantograph motion and a ball and socket connection at the shoe support, positive contact will be maintained even if a bar becomes misaligned in either horizontal or vertical plane. Although inverted-Y electrification has been used on this manufacturer's cranes for several years, this is the first time it has been offered for use on all makes of cranes and runways. The Cleveland Crane & Engineering Co.

7—HOSE REEL features compressed air rewind

To rewind "payed out" hose, the operator of this reel presses the "one-finger" control lever which sends air through the control to the motor, which drives the revolving drum. To stop the reel at any time during the rewind, he has only to lift his finger and the control cuts off the motor. In addition to their operational advantages, these explosion proof compressed air rewind reels are easier to install and maintain, according to manufacturer. The motor and valve control system simplifies the compressed air piping arrangement, it is noted, and there



These Crane valves stay tight on soap oils and fatty acids

THE CASE HISTORY—Leakage through valve seats in raw materials supply lines posed a serious problem for Davies-Young Soap Co., Dayton—makers of various type soaps and cleaning fluids. Unwanted materials leaking past metering stations would infiltrate processing vats.

Four different makes of valves were tried before these Crane valves were installed. With all four, results were the same—seat leakage developed quickly; the valves lasted no more than 4 to 8 weeks.

Valve replacement costs were a factor on top of production losses.

The condition was remedied on installation of Crane No. 1670 Ni-Resist cast iron valves in January 1954. Eighteen months later—with no piping maintenance and no shutdowns whatsoever—the Crane valves are still holding tight. And they show no deteriorating effects from the fluids handled.

Crane Ni-Resist gates don't *look* much different from similar valves of other makes. Their difference is in properly designed, accurately finished seating of 18-8 SMo stainless steel—plus the *extra* erosion-corrosion resistance of Ni-Resist bodies and bonnets cast by Crane. Thrifty buyers know these valves have no "equal" for handling many hard-to-hold, mildly corrosive fluids.

You should have the new folder (AD2047) on these valves. Ask your local Crane Representative for a copy, or write to address below.

CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

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NEW PRODUCTS

(Begins on page 136)

is no need to install extra piping and outlets to release air when the motor is stopped. A built-in automatic back pressure relief valve affords easy unwinding.

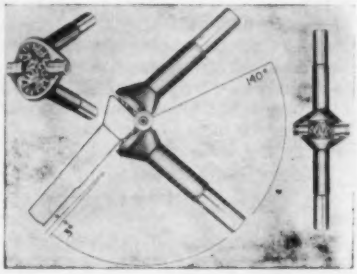
For installation in hard-to-reach areas, the control can be supplied off the reel for placement within reach of the operator. The complete rewind assembly consists of lever control, air hose which joins control and motor, and the motor itself. It may be ordered with all of company's hose reels designed for hose up to 3 in. ID. Clifford B. Hannay & Son, Inc.

8—COAGULANT for turbid river and surface waters

Nalco 600 — a polyelectrolyte — is announced as a low-cost, low-dosage coagulant and coagulant-aid which shows most promise in coagulating turbid river and surface waters for industrial and cooling use. According to company, it will effect excellent coagulation in many cases where presently available treatments are ineffective and where iron and alumina floc carryover is a problem. Nalco 600 is also recommended for waste water treatment as well as for paper mill treatment of water for general service and for setting in savealls. A clear, liquid, alkaline and non-corrosive to steel, the product is also useful in lime-soda plants, processes. National Aluminate Corp.

9—JOINT carries shaft power around the corner

Described as a first cousin to the universal joints this company manufactures, this new hinged gear joint is said to carry shaft transmitted power "around corners" with ease. In fact, it is claimed to operate smoothly in most applications where power must be "angled" to any position from 3 to 140 deg away from a straight



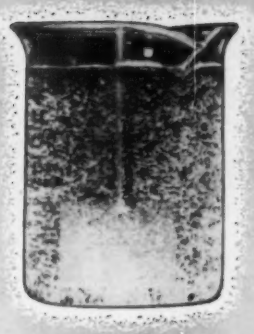
line—and without shutting off or reducing speed of the power transmission during this wide swing.

The hinged gear joint is currently made for use on three shaft sizes ($\frac{1}{16}$, ½ and $\frac{5}{16}$ in.) and with an overall length of 10¼ in. Primary link in its power train are two bevel gears modified to mesh smoothly and consistently through the full 137 deg arc, despite the constantly changing relationship between the pitch line and the axis of each gear. Although

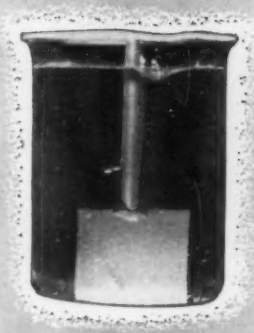
A New, Better Coagulant

NALCO 600

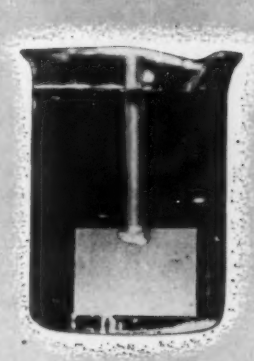
POLYELECTROLYTE



Alum



Alum plus
typical polyelectrolyte



Alum plus
Nalco 600

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Extremely difficult coagulation conditions provide especially economical applications for Nalco 600. It can be used alone or in conjunction with other coagulants. A very low dosage of Nalco 600 usually permits as much as 50% reduction in dosage of alum, activated silica, iron sulfate or clay type treatments . . . and results in a cleaner, clearer supernatant liquid.

Nalco 600 was invented in the Nalco Laboratories, and is being manufactured *only* by Nalco. For complete data on Nalco 600, and expert technical assistance to solve your clarification and coagulation problems, call Nalco now.

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The Flox Company, Inc., Minneapolis 3, Minnesota

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DODGE PRODUCTS
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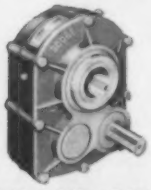
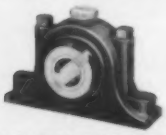
DRIVES & COUPLINGS



TORQUE-ARM
SPEED REDUCERS



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Write for your copies.
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DODGE
of Mishawaka, Ind.

For more facts circle 576 on Reply Card

NEW PRODUCTS

(Begins on page 136)

intended primarily for hand-operated remote controls, the joint is also announced as suited to use on out-of-line power transmissions up to ¼-hp at speeds not over 1750 rpm. Used in multiples, the gear offers almost unlimited possibilities. The Gray & Prior Machine Co.

10—ACOUSTICAL TILE is textured, easily cleaned

Textured Sonofaced Acoustical Tile offers the advantages of two of manufacturer's other tiles—a textured tile with soft white finish, and Sonofaced Tile. The latter is encased in a plastic film which, without impairing the noise control function of the sound absorbing Fiberglas, permits repeated washing and requires no painting. In the new product a plastic film duplicates the surface appearance of the textured tile and has light reflection 10 points greater than that of the regular Sonofaced Tile. It is available in 12-by-12 in. and 12-by-24 in. tile and 24-by-48 in. ceiling board. Owens-Corning Fiberglas Corp.

11—PORTABLE OILER catches oil, chips and cut-offs

The problem of how to flood dies with cutting oil while threading pipe with hand die stocks, by muscle or power drive, is said to be solved by the Ridgoilr. This is a portable device consisting of a

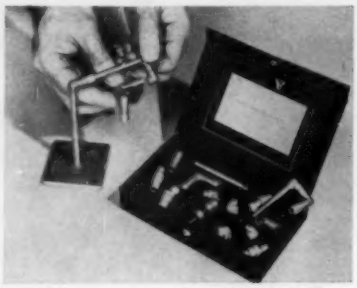
removable 15-in. wide chip pan in an oil reservoir with carrying bail, from which a screened hose connects with a hand-operated oil pump-gun. Placed under the work, device catches oil, chips and cut-offs, keeping floors clean, while allowing an endless stream of clean oil on dies, cooling and protecting them. Company says that more than 95 per cent of oil is saved. The Ridge Tool Co.

12—FORK TRUCK equipped for using LP gas

The Dynamotive—a gas-electric driven fork lift truck—is now available with an engine equipped for operation with economical LP gas. The LP system has been accomplished by modifications of truck's engine and the addition of a pressure tank that can be supplied for either propane or butane gas, according to company. Automatic Transportation Co.

13—MODEL KIT demonstrates flexible piping layouts

Scale model kits are available to demonstrate the many arrangements you can work out using this manufacturer's swing joint and flexible ball joints to provide flexibility in piping handling gasoline, alcohol, solvents, LP gas, acids, fuel oil and other fluids. In actual practice, these



small models are worthwhile time savers in visualizing design arrangements, to work out "movement problems," and in checking for capabilities, limitations and clearances. The kit includes a selection of straight and angle joints, along with various lengths of "piping" and a base for mounting. The parts fit together without tools, show the 360 deg swing of both joints, plus the 30 deg to 40 deg angular flexing of joints. Barco Mfg. Co.

14—GATE VALVE with cylindrical body neck

The redesigned No. 430, a 125-lb brass rising stem double wedge disc gate valve, is designed for general service on steam, water, oil and gas lines, and comes in sizes from ¼ in. through 3 in. Body neck in the model is cylindrical. This design offers maximum strength on body structure, it is pointed out, and eliminates need for massive wall sections. It affords a compact, relatively lightweight valve, says company, yet is ideal for resisting internal pressures. The cylindrical neck reinforces seat area against wedging of the disc and safeguards against distortion of the body in seating the disc. Sizes ½ in. and larger are fitted with double wedge type disc; sizes ¼ and ⅜ in. have solid wedge discs. All sizes feature slip-on type disc-stem connection. Valves ¾ in. and larger are equipped with a stuffing box gland. Crane Co.

15—COTTON TAPE seals ventilating duct work

Permacel 691 Silver Cotton Cloth Tape is produced especially for sealing duct work in heating, ventilating, and exhausting systems, holding building insulating materials, and bundling sheet metal. Of plastic coated cotton cloth backing, the new tape is 0.014 in. thick, with a tensile strength of 55 lb per inch width,

TAPER-LOCK

A PATENTED PRODUCT OF DODGE

—OFF THE SHELF

NO REBORING!
NO KEYSEATING!
NO MACHINING!

Ready for the shaft, with no costly, time-consuming operations to make them fit. That's the big news about Dodge Taper-Lock Sprockets. Taper-Lock grips the shaft with the firmness of a shrunk-on fit, yet comes off easily. Bushings may be re-used. They come in sizes to meet most every application.

Taper-Lock Sprockets are available from Distributors' stocks in a complete range of B-type steel sprockets —½" to 2" pitch. Dodge quality Roller Chain is packaged in 10-foot lengths—also available in 50-foot and 100-foot reels. Save time—save money—keep production rolling—get Dodge Taper-Lock Sprockets and Roller Chain from your Dodge Distributor.

DODGE MANUFACTURING CORPORATION, 2700 Union St., Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor, for valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

THERE'S ONLY ONE TAPER-LOCK, THE BUSHING THAT MOUNTS FLUSH!

Standardize, economize with Taper-Lock, the bushing that is interchangeable in Dodge sprockets; sheaves, couplings and conveyor pulleys. *More than 2,000,000 in use!*

DODGE

of Mishawaka, Ind.

For more facts circle 577 on Reply Card

CM HOISTS

VERSATILE TOOLS that belong in every efficient plant

CM CYCLONE

Light Weight—Heavy Duty
High Speed Chain Hoist
Capacities from ½ to 10 tons

Made of tough aluminum alloy. Carries with ease. 1 ton model weighs only 36 pounds. 42% fewer parts. Requires little maintenance. Sealed-in lifetime lubrication. 96% efficient. Equipped with Herc-Alloy flexible welded load chain. The best there is in hand hoists...yet reasonably priced.

CM PULLER

Lifts or Pulls
At Any Angle
¾, 1½, 3 and 6 ton capacities

For lifting, pulling, skidding, stretching, straightening. Use at any angle. Eliminates dangerous makeshift methods. Automatic brake. ¾ ton model weighs only 13 pounds. Herc-Alloy flexible welded load chain. Time savings quickly repay low initial cost.

● **ALSO** Meteor Wire Rope Electric Hoists (½ to 5 tons), Comet Electric Chain Hoists (½ to 2 tons), CM Trolleys and CM Cranes.

CALL THE CM DISTRIBUTOR FOR CATALOGS, PRICES AND QUICK DELIVERY FROM STOCK.

CM HOISTS AND CHAIN

CHISHOLM-MOORE HOIST DIVISION
COLUMBUS McKINNON CHAIN CORPORATION
TONAWANDA, NEW YORK
REGIONAL OFFICES: NEW YORK, CHICAGO, CLEVELAND
In Canada: McKINNON COLUMBUS CHAIN LIMITED, ST. CATHARINES, ONTARIO
For more facts circle 578 on Reply Card

NEW PRODUCTS

(Begins on page 136)

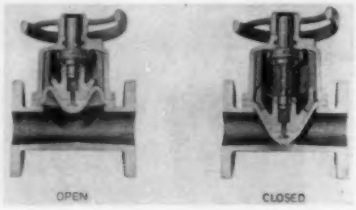
and a tear strength of 500 gm. It offers permanency of color and adhesion, says company, and is water and moisture resistant, providing an effective seal against air leaks and dusts. Although strong and abrasion-resistant, the tape is easy to use, manufacturer notes, and sticks and conforms to the job at low temperatures enabling work during winter. The Permacel Tape Corp.

16—PUTTY brushes on easily, stands outdoor weather

No putty knife is needed to apply Rap's Brush-On Putty—it brushes on quickly and dries semi-translucent. According to manufacturer this product adheres better and faster than most putty, and really withstands outdoor weather. It may also be used for caulking, crack filling and tile setting, with less of the material required. A gallon costs less than $12—quarts and pints are available, too. Randolph-Page, Inc.

17—DIAPHRAGM VALVE offers straight-through flow

The Grinnell-Saunders Straightway Diaphragm Valve is designed to offer the extra advantages of straight-through flow for handling viscous materials, fibrous



slurries, sludges, semi-fluids and solids in suspension. Attributed to the Straightway feature are: ability to handle viscous material without restriction or stoppage; minimum pressure drop; rodding or brushing without removing valve bonnet and without possible damage to body linings; and self-drainage when pipe line is pitched sufficiently to drain the piping. This valve retains advantages of company's weir type diaphragm valve, it is pointed out, including positive closure even with gritty or fibrous materials. Saunders Valve Dept., Grinnell Co., Inc.

18—HEAVY-DUTY FLASHLIGHT made of rugged nylon

Designed to resist extremes of heat and cold, as well as rough handling, the Workman N22 is a heavy-duty flashlight made of chemically resistant nylon. According to manufacturer, this flashlight is unaffected by common organic solvents and compounds containing gasoline, oil, grease, paint remover, lacquer, carbon tetrachloride, alkaline cleaners and others. Completely molded in nylon, the Work-

Ask YOUR LYON Dealer for

LYON®

STEEL EQUIPMENT

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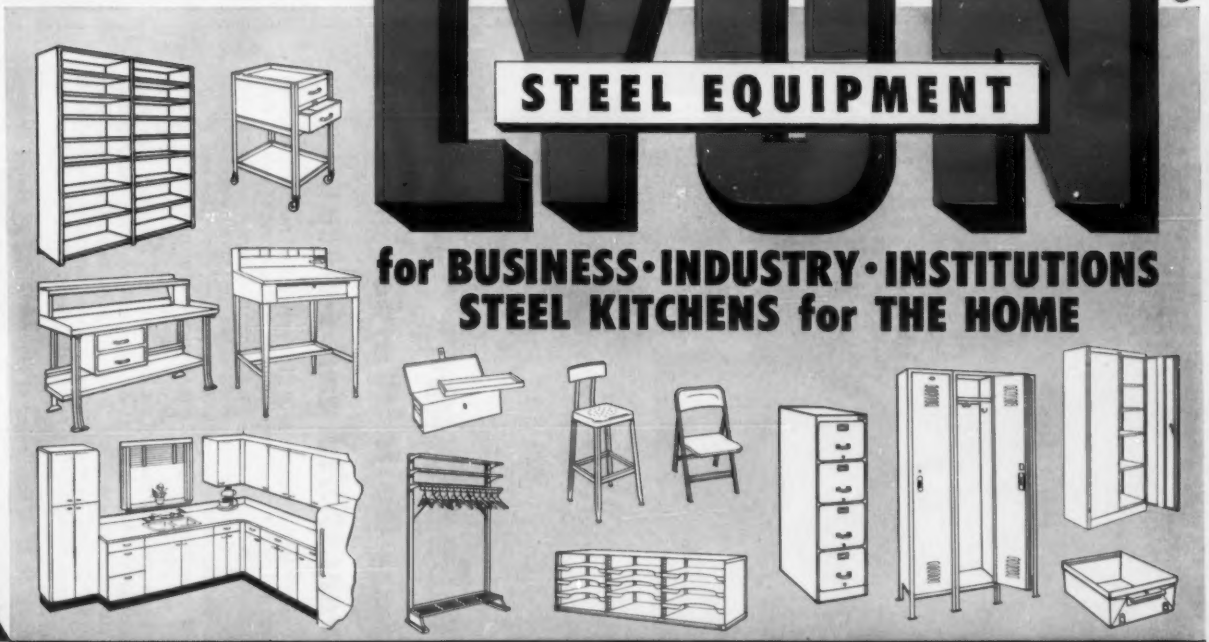
STEEL KITCHENS for THE HOME



LYON METAL PRODUCTS, INC.

General Offices: 191 Monroe Ave., Aurora, Ill.
Factories in Aurora, Ill. and York, Pa.
Dealers and Branches in All Principal Cities

A PARTIAL LIST OF LYON STANDARD PRODUCTS

• Shelving	• Kitchen Cabinets	• Tool Toters	• Chests and Safes	• Flat Drawer Files	• Folding Chairs	• Service Carts	• Tool Stands
• Lockers	• Cabinet Benches	• Bar Racks	• Display Equipment	• Revolving Bins	• Coat Racks	• Sorting Files	• Shop Boxes
• Stools	• Storage Cabinets	• Tool Boxes	• Toolroom Equipment	• Filing Cabinets	• Work Benches	• Drawer Units	• Tool Trays
• Bin Units	• Drawing Tables	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks

"Old Faithful"

COCHRANE MULTIPORT RELIEF VALVE with cover removed showing the Multiport Valves that assure smooth, pulsationless operation.

Cochrane

Multiport Relief Valves

offer versatility and safety

Cochrane Multiport Relief Valves protect the system and its interconnected equipments against too high pressure. Unlike ordinary relief valves, they relieve overpressure g-r-a-d-u-a-l-l-y to atmosphere, they reseat g-r-a-d-u-a-l-l-y, gently—without blowdown, back surge or vapor hammer. Thus, *they maintain system stability even while performing their function of full protection.* Unlike ordinary relief valves, Cochrane Multiport Relief Valves *can be quickly set and reset to suit desired operating conditions.* Cochrane Multiport Relief Valves are made of various materials to satisfy maximum operating conditions. They function equally well handling saturated or superheated steam, air or gas. *They "iron out" pulsations.* Their corrosion-resistant, "vapor cushion" valve discs will not rust, freeze or stick. Here is maximum safety and reliability in a relief valve designed and built for long, continuous service.

For further information concerning Cochrane Multiport Relief Valves, write for Publication 5200.

NOTE: *Cochrane Multiport Relief Valves are adaptable to check, spillover and other services.*

COCHRANE CORPORATION · WATER AND HEAT ENGINEERS · SINCE 1863 · PHILADELPHIA

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Representatives in 30 principal cities in U.S.; Toronto, Canada; Paris, France; La Spezia, Italy; Mexico City, Mexico; Havana, Cuba; Caracas, Venezuela; San Juan, Puerto Rico; Honolulu, Hawaii.
Pottstown Metal Products Division—Custom built carbon steel and alloy products

Demineralizers • Hot Process Softeners • Hot Zeolite Softeners • Dealkalizers • Reactors
Deaerators • Continuous Blowoff Systems • Condensate Return Systems • Specialties

For more facts circle 580 on Reply Card

NEW PRODUCTS

(Begins on page 136)

man N22 has no exposed metal parts. It has a removable end cap with molded nylon ring holder, an aluminized reflector for spot and piercing beam, and a spare lamp holder. All parts are replaceable. A two-cell size, retails around $3.25, and a three-cell size, $3.65, without batteries. Ray-O-Vac Co.

19—WELDING CABLE is flexible and non-kinking

Type D866 light weight aluminum welding cable is announced as having an excellent degree of flexibility and is constructed to prevent kinking. The combined insulation and jacket of tough vulcanized rubber afford resistance to abrasion, impact, flexing and twisting. The cable provides safety and long service life, it is claimed, and also reduces operator fatigue. General Cable Corp.

20—POWER CYLINDER designed for longer life

Several new cylinder features designed to provide longer cylinder life, improved performance and wider usage have been adopted as standard specifications on this company's line of air and hydraulic cylinders. The new features are: case-hardened, chrome plated piston rods, Teflon rod wipers, Teflon hydraulic rod seals, and black ferric oxide surfaces. Case-hardened rods are now standard on the air and hydraulic cylinders and are said to be practically immune to damage from accidental hammer blows, dropped tools, mishandling. Teflon rod wipers and seals are said to withstand temperatures from -100 F to 500 F, and to be impervious to practically all known chemicals including fire-resistant and other hydraulic fluids. Miller Fluid Power Co.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 181-182.

21—TESTER checks voltage, continuity and grounds

Model 123 Maintenance Tester checks line voltage, traces continuity in electrical circuits, and tests motors with 500 v for grounds or poor insulation. Since this tester needs no power supply, machinery and electrical equipment can be checked from the power line to the motor on the job. Line voltages up to 500 v a-c are read on a 4½-in. meter. Continuity is traced with 6 v—sufficient to trace a circuit through burned or pitted contacts—and is indicated as good, fair or poor on a colored band-scale. The unit has 8-ft test leads with push-on probes for check-

MICRO SWITCH Precision Switches
A PRINCIPLE OF GOOD DESIGN

Here's a NEW, smaller size limit switch!

LONG LIFE...PRECISE ...2 CIRCUIT!

compact to fit in small space

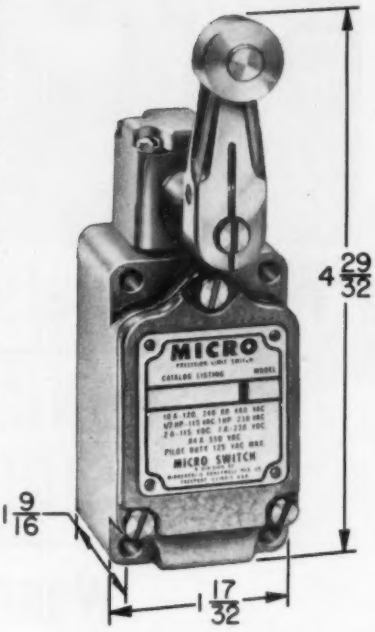
Housing is 3-11/16" high, 1-9/16" deep and 1-17/32" wide.

versatile for any actuation

You can adjust it to operate clockwise, counter clockwise, or in both directions. Head may be positioned in 4 quadrants with actuation possible from any quadrant. Roller lever is adjustable through 360°, locking at any position.

sealed for any environment

Seals on actuator shaft and between actuator head and housing provide maximum protection against entrance of dust, oil or other liquids.

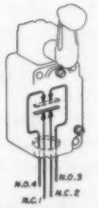


New MICRO SWITCH LS Limit Switch

high capacity

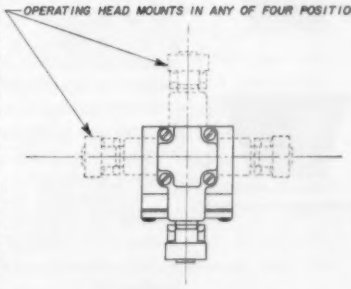
Rated at 10 amperes, 120, 240, 480 volts a-c; ½ HP, 115 volts a-c; 1 HP, 230 volts a-c; Pilot Duty—600 volts a-c, maximum.

See this new MICRO SWITCH "LS" Limit Switch at your local MICRO SWITCH Distributor. Look in the Yellow Pages of your phone book under "Switches, Electric"



Contact arrangement

Contact arrangement of basic switching unit is double-throw, two-circuit, single-pole, double break.



Adjustable head assembly

MICRO SWITCH products make plant equipment safer, more automatic and more productive

A complete line of snap-action and mercury switches

MICRO SWITCH provides a complete line of extremely reliable, small-size, high-capacity, snap-action precision switches and mercury switches. Available in a wide variety of sizes, shapes, weights, actuators and electrical characteristics. For all types of electrical controls.

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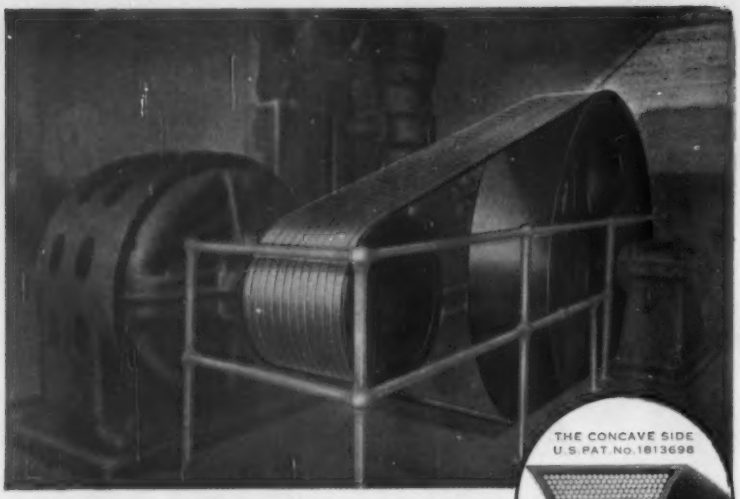


Why a V-Belt with CONCAVE SIDES wears longer

It is easy to demonstrate to yourself why the concave sides (Fig. 1) of the Gates belt greatly lengthen belt life.

Simply bend a Gates belt and feel the sides. Notice how these precisely engineered concave sides *fill out* on the bend and *become straight.* Thus a Gates belt grips the sheave groove evenly (Fig. 1-A) and wear is distributed uniformly across each side of the belt. That means longer belt life; lower costs.

Make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating the wear at points shown by arrows.

To assure longer wear and keep belt costs down, specify the V-belt with concave sides—Gates Vulco Rope . . . readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado —*World's Largest Maker of V-Belts.*

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 68

Gates VULCO ROPE Drives

For more facts circle 582 on Reply Card

NEW PRODUCTS

(Begins on page 136)

ing circuits in deep control panels, and push-on crocodile clips for making connections while ground testing or hand-operating contactors or switches. The tester is fuse protected, is powered by a 6-v lantern battery. Slaughter Co.

22—SOLENOID VALVES offer improved fluid flow

In these solenoid valves, the synthetic diaphragm "floats" free to provide greater fluid flow at lower pressure differentials. Pilot operated without metal-to-metal contacts, they are claimed to be practically service free. The units are suggested for the control of water, air, brine,

light oils, industrial gas, Freons 12 and 22 and other non-corrosive fluids at temperatures from 0 to 225 F. Applications include air conditioning, refrigeration, hot water heating, hydraulic pressure systems, automation installations. The valves are designed to operate with any pressure differential between 1 and 250 psi.

Available in a variety of sizes with port openings from $\frac{3}{8}$ to $1\frac{1}{2}$ in. diam, the units have screw, solder or flare connections. They may be had with or without manual operator that opens an auxiliary pilot port within the valve and allows systems pressures to actuate the diaphragm in the event of electrical failure. Jackes-Evans Mfg. Co.

23—PUMP designed for downhill pumping service

Minus Delta P Pumps are designed to accurately meter liquids or gases against negative discharge pressures. These controlled volume pumps are claimed ideal for all low capacity flow control problems that involve metering from high suction to lower discharge pressure. According to manufacturer, the units are immune to pressure variations in the system, only requiring that suction pressures be maintained (naturally or mechanically) at least 5 psi above discharge pressures.

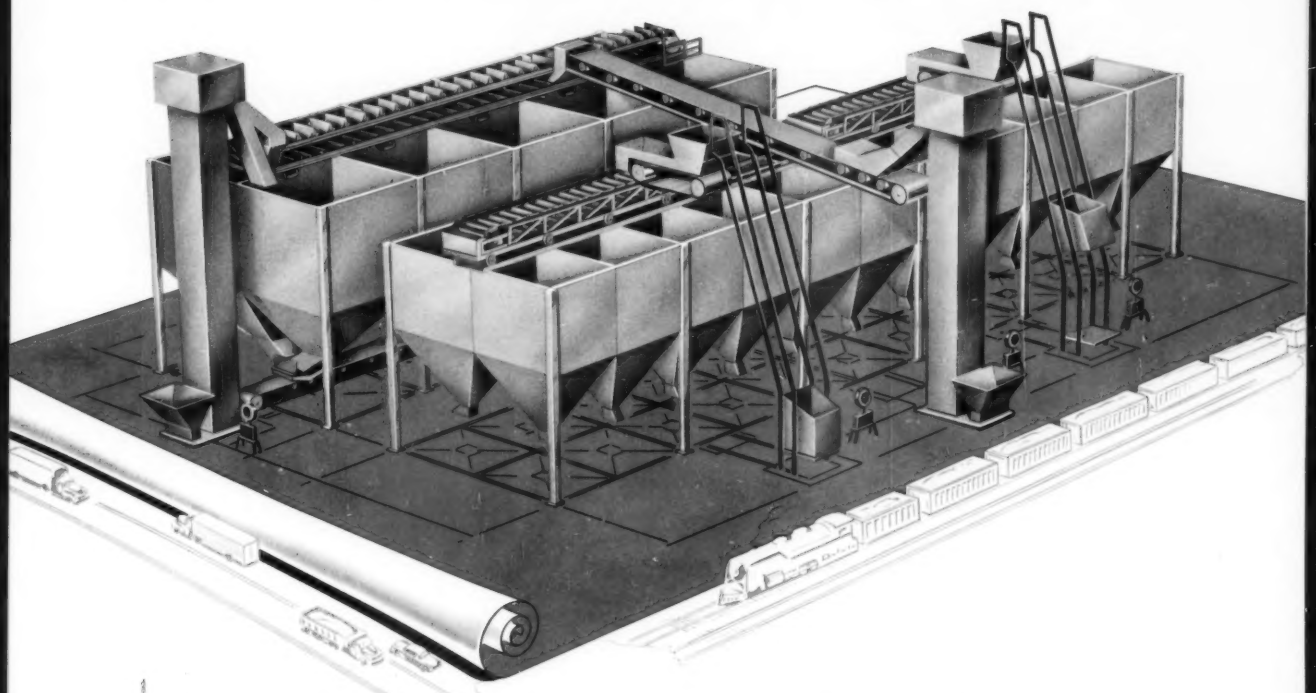
These low cost pumps come in four standard sizes of approximately 3, 15, 75 and 375 ml per cycle. Capacity is manually or automatically adjustable during operation through stroke length or speed

For more facts circle 583 on Reply Card ——→

WEBB

Engineered Ingenuity

CUTS COSTS . . . INCREASES PRODUCTION AT MUELLER BRASS



A constant regulated flow of brass remelt, in the form of chips and solids, is a vital factor in the cost and rate of production at Mueller Brass in Port Huron. The Webb conveyor system simplified their bulk handling operation —helped to increase their production—gave greater storage capacity—eliminated manual handling—lowered manufacturing costs.

Mueller is dependent upon a constant flow of metal to feed their melting furnaces, casting machines and extrusion machines. Manual operation had been cumbersome and difficult to pace with the needs of the furnaces. A series of conveyors now easily pace the rate of feed into furnaces and allow a steady build-up of stock pile. In all, ten conveyors (representing five types), three bucket elevators and four skip hoists are coordinated into a synchronized materials handling system. For example, when remelt arrives at Mueller it is loaded into either a bucket elevator for chips or a skip hoist for solids. The material is carried and deposited, in the case of brass chips, onto a belt conveyor for automatic movement to storage bins. The solid brass is carried by the skip hoist to a reversible shuttle apron conveyor and deposited in the storage bins for solids. These conveyors handle such a high volume of remelt that a well balanced stock pile is maintained at all times . . . very important to Mueller's operation. Other Webb conveyors are utilized in processing brass from the bins to the furnaces, the casting machines, and the extrusion machines.

Webb conveyors are being used by many companies for mechanized handling of all types of bulk materials. Let Webb engineers show you how automatic handling brings increased profits. You can take the first step toward increased profits by writing Webb today.

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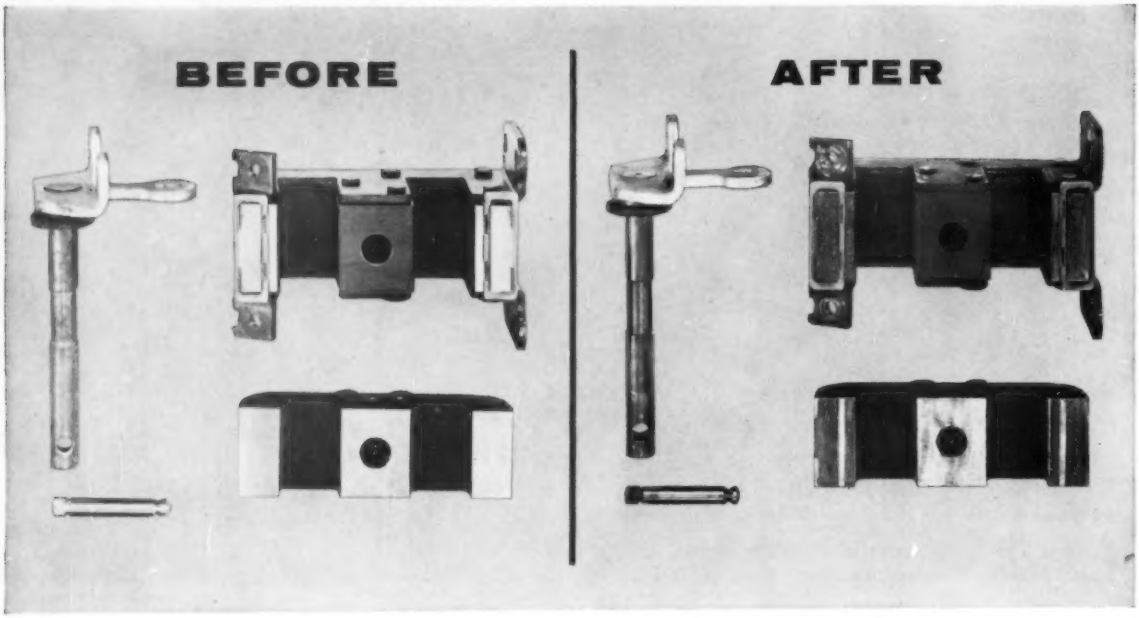


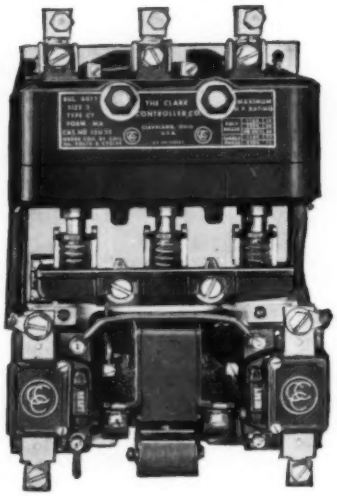
PROOF OF LONG LIFE OF CLARK TYPE "CY" STARTERS

These unretouched photos show magnet parts of a CLARK Bulletin 7707 Contactor—the contactor used on standard CLARK Bulletin 6013, Size 2, Type "CY" AC motor starters—as they looked before and after nearly 3 years of continuous service. During this time the contactor opened and closed 4 to 5 times per minute, 24 hours per day, 7 days per week—a total well over 5 million operations.

The contactor was in service at Taylor Instrument Companies, Rochester, N. Y., on a "Hevi-duty" molten salt pot electric furnace used for instrument calibration. It was installed *after several contactors of another make had failed in 4 months or less.* Our contactor was still performing perfectly when it was replaced by another identical unit, so that we could study the magnet wear.

All wearing surfaces were carefully "miked" and each dimension compared with the original. As seen in the "before and after" photos, wear was barely apparent to the naked eye. Micrometer readings showed actual wear measurable only in thousandths and ten thousandths of an inch. Only a fraction of the usable life had been consumed.

Write for descriptive literature.



CLARK Type "CY" Starters *include many more features for dependable service and reduced maintenance. Let us tell you the complete story.*

The **CLARK** **CONTROLLER** *Company*

Engineered Electrical Control

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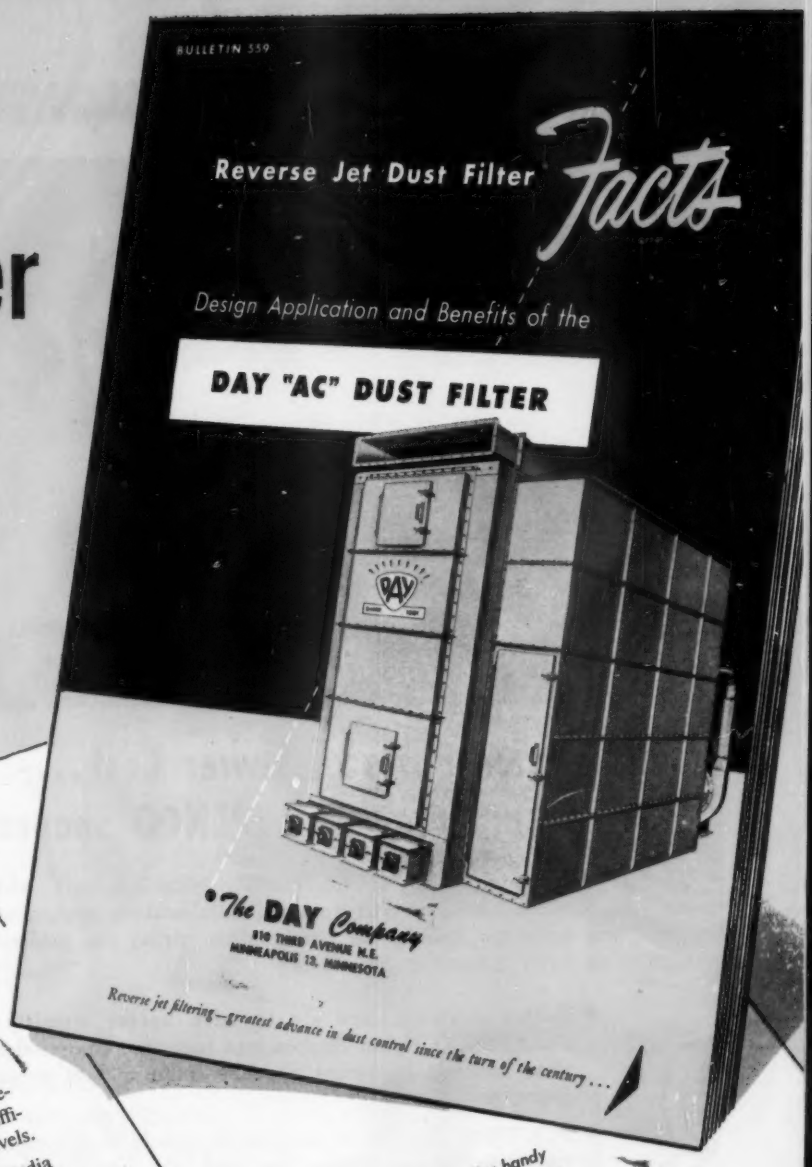
For more facts circle 585 on Reply Card →

NEW Dust Filter FACTS...

SEND FOR YOUR FREE COPY OF THIS VALUABLE BOOK


BULLETIN 559
Reverse Jet Dust Filter Facts
Design Application and Benefits of the
DAY "AC" DUST FILTER
The DAY Company
910 THIRD AVENUE N.E.
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Reverse jet filtering—greatest advance in dust control since the turn of the century...

IMPROVE your knowledge of Dust Filters and Dust Control!

- Read why the Hersey reverse jet principle is the most significant improvement in dust filter design in more than half-a-century.
- Discover why self-adjusting reverse-jet cleaning rings raise dust filter efficiencies to new high performance levels.
- See for yourself how felted filter media removes sub-micron dust particles that escape woven filter fabrics.
- Compare the features and performance of various dust filters in one easy to read comparison chart.
- Profit by helpful pages of air engineering data and charts.

Free! Send today for handy reference edition, twenty-four page book on dust filters and dust control. **Request your copy now!**

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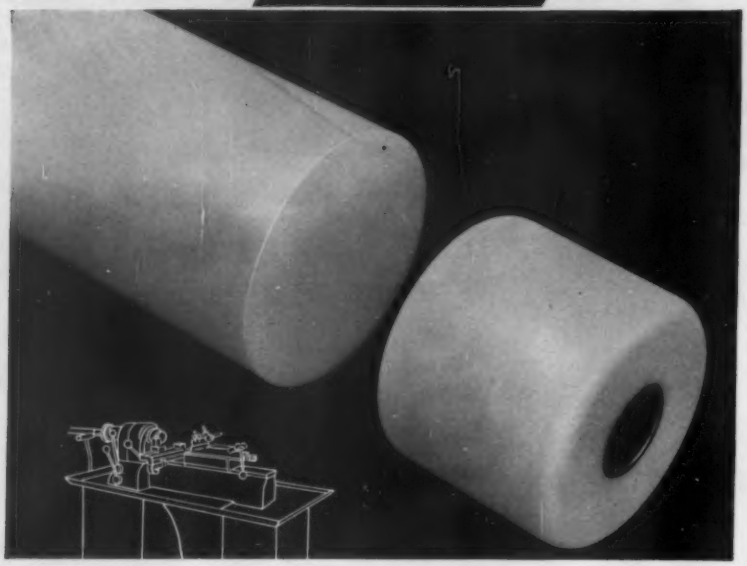
POLYPENCO® NYLON SHAPES



Quality Nylon Parts at Lower Cost... *Fabricate* From POLYPENCO Shapes

• Take the uniform high quality of POLYPENCO Nylon Shapes . . . add fast, economical machining on your standard metalworking equipment . . . and you have an unbeatable combination giving you highest quality nylon parts at low cost. Here's why:

- Better performance starts with better quality: POLYPENCO Nylon Shapes are manufactured under rigid controls to assure absolute uniformity in every piece, every order.
- POLYPENCO Nylon is supplied in standard shapes of rod, strip, tubing, tubular bar and slab. On standard metalworking tools you fabricate your own parts—rapidly, economically.
- You save costs of molding dies, get greater design flexibility, fabricate to close tolerances. Machining is easy, requires no special operator training or skill.
- No costly delays in your production schedules . . . POLYPENCO Nylon Shapes are carried in stock, available for immediate delivery in stock sizes.

Technical bulletins and prices mailed promptly in answer to your request.

When Parts Call for Nylon Specify POLYPENCO!

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POLYPENCO Nylon, Teflon*, Q-200.5 and K-51

*DU PONT TRADEMARK

For more facts circle 586 on Reply Card

NEW PRODUCTS

(Begins on page 136)

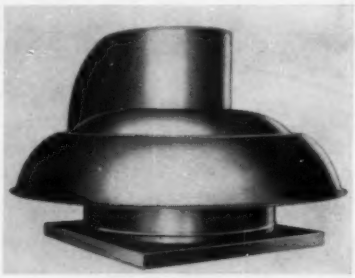
control. Standard materials are 316 stainless steel with Neoprene or Tygon trim. Company reports that leak-proof construction lets pumps handle dangerous and corrosive materials. Milton Roy Co.

24—WORK GLOVES are seam-free, palm-coated

Newest additions to company's line of work gloves, a palm-coated knit wrist glove and a 10-in. band top style, also palm-coated, have been designed to allow more than 47 sq in. of seam-free work surface, which means that seams are completely eliminated from abrasion points. The plastic coating, company points out, offers a superior wearing non-slip satin finish. The Pioneer Rubber Co.

25—ROOF VENTILATOR is low in silhouette

This centrifugal roof ventilator has been designed for buildings where pleasing appearance and quiet performance are prime requisites. Ventilator is reported to move large volumes of air efficiently



against static pressures at low speeds—and accordingly at low noise levels. Its large unit exhaust capacity is accomplished at low fan tip speeds by a backwardly curved non-overloading centrifugal fan. The wheel runs in a venturi shaped inlet ring which further reduces air turbulence noise and increases operating efficiency. Low in silhouette, ventilator is designed to blend with modern architecture. Bulletin DR-40-55 gives more details. DeBothezat Fans Div., American Machine and Metals, Inc.

26—AIR COMPRESSOR is light in weight, compact

Model 130R1500 Air Compressor has a capacity of 1.75 cfm of free air and a rated discharge pressure of 3000 psi. It weighs only 38 lb and is 17 in. high. Complete assembly includes compressor, oil filter and moisture separator, self-rescaling relief valve, 0-4000 psi pressure gage, and an integral 110-220-v 60-cycle a-c electric motor. Compressor operates at 3450 rpm and has three stages of compression. Both compressor and motor are air cooled. According to manufacturer, the low discharge rate helps

IT'S A WISE ENGINEER . . .

WHO SPECIFIES DeLuxe

YOU CAN SAVE 50% OF YOUR INSTALLATION EXPENSE

ONE GOOD REASON WHY YOU SHOULD CONSIDER DeLuxe

DeLuxe features "bin type" one-piece uprights . . . made with I-beam construction for strength. It's so easy to install, no panels to bolt . . . three conventional pieces "molded" in one!

WRITE FOR OUR FREE 48-PAGE SPECIFICATION CATALOG NO. 29. YOU ARE NOT OBLIGATED WHEN YOU USE OUR "PLANT LAYOUT SERVICE." THERE IS A DeLuxe FACTORY TRAINED REPRESENTATIVE AS NEAR TO YOU AS YOUR TELEPHONE.

It's wise to specify DeLuxe Careful selection of shelving now . . . will save you set-up headaches and extra expense later. DeLuxe shelving is fully finished . . . no rough edges . . . our special components make it possible to assemble in half the time . . . heavy gauge materials are used throughout . . . it's versatile . . . for any plant requirement. When you spell out "DeLuxe" on your proposed plant layout . . . you've protected your shelving investment for all time.

DELUXE METAL FURNITURE COMPANY

398 Struthers Street, Warren, Pa.

A DIVISION OF THE ROYAL METAL MFG. CO.

Manufacturers of "Verti-File", "Templa-File", and quality factory furniture.

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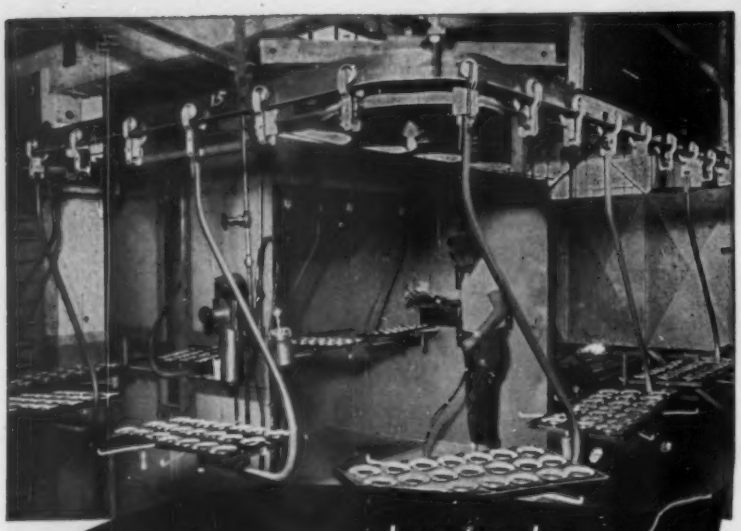
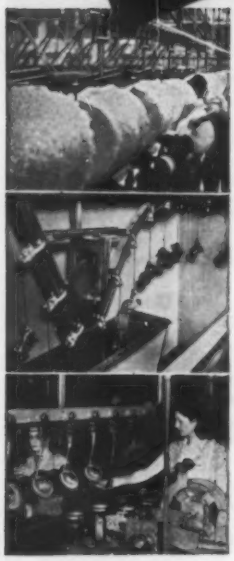




LOWER INITIAL COST — Buschman "Universal" Cable Conveyors not only cost less but also outperform heavier, more expensive conveyors for light and medium-weight applications.

LOWEST MAINTENANCE COST — Constant take-up readjustment is eliminated because of a safety factor of 14-to-1 or greater.

LOWEST REARRANGEMENT COST — Exclusive Buschman design plus lightweight all-bolted construction make future changes fast and easy.

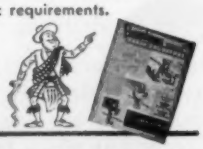
MORE COMPACT DESIGN — Shorter radius curves and dips permit more complete utilization of production and storage space . . . both overhead and at work level . . . require less room inside industrial ovens, washers, dip tanks, etc.

SMOOTHER OPERATION — There are no pulsations or jerks to damage delicate parts or finishes when your product is handled on Buschman Cable Conveyors.

PRE-ENGINEERED — Using Buschman standard stocked parts, your own crew can set up a "Universal" Cable Conveyor tailored to your specific requirements.

PRODUCE MORE . . . FOR LESS
Buschman Conveyors
C-208-EWB

Write today for catalog.



THE E. W. BUSCHMAN COMPANY
4426 Clifton Avenue • Cincinnati 32, Ohio

For more facts circle 588 on Reply Card

NEW PRODUCTS

(Begins on page 136)

assure compressed air free of contamination with oil and moisture. Although designed primarily to provide fresh air for breathing equipment, applications for this unit include pressurizing actuators, receivers and accumulators. For carrying convenience, there's a handle at the top of the fan guard. The Cornelius Co.

27—PENETRATING OIL for lubrication, rust prevention

Bear Penetrating Oil is announced as fast acting and having a high flash-point. Company says it loosens rusted and frozen metal parts, bolts, bushings, pipes, battery connectors in minutes. Low evaporation gives long protection period to dies and other metal parts it is noted, and efficiency is unimpaired by extreme temperatures. The oil may be used with any standard applicator. It is available in gallon cans or 55-gal drums. House of Laurila.

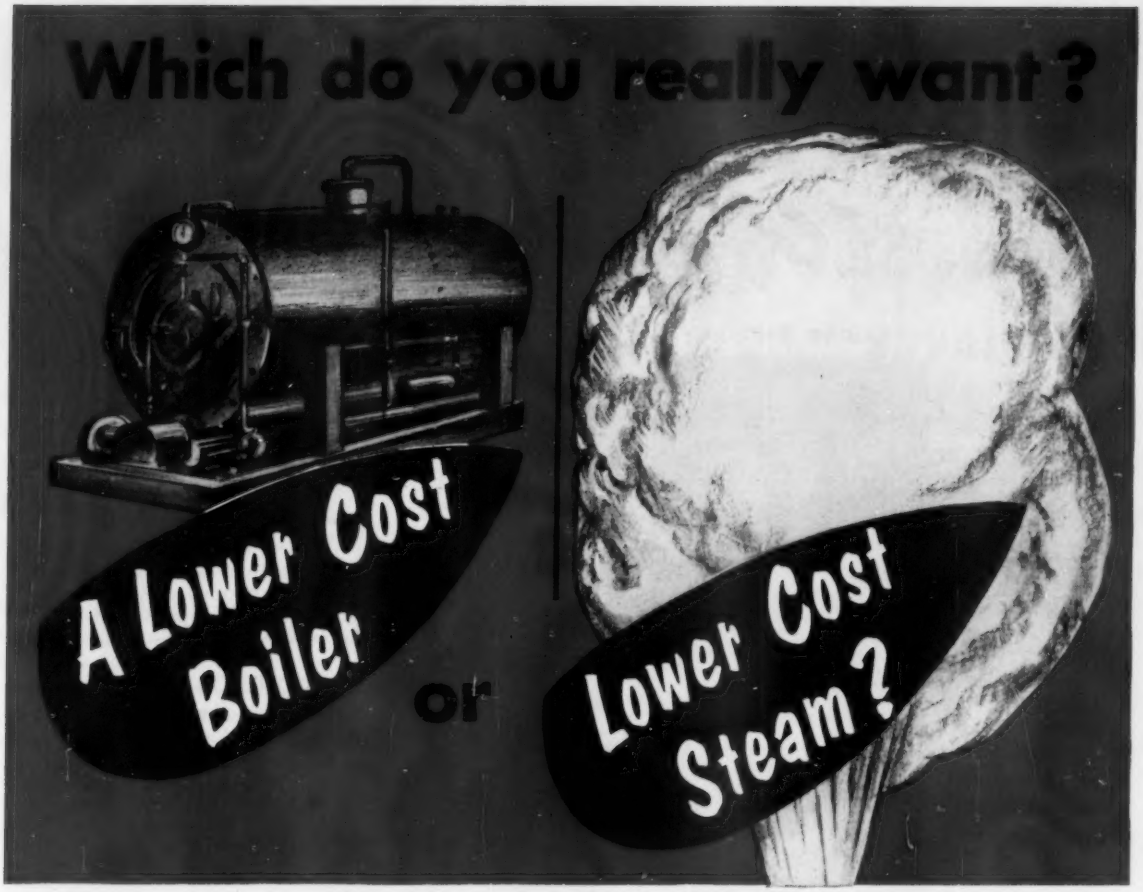
28—STEEL-WOOL PAD, welded for long life

The type of construction utilized in this pad is designed to prevent shredding and bunching, let the pad wear evenly, and get all the wear out of all the material. As a result, company points out, the

welded pad outwears many steel wool pads three to four times. Also, with uniform contact assured, welded pad does a finer job and faster. It is available in a range of fine to coarse grades to meet steel-wooling needs in connection with floor care—refinishing, dry cleaning and polishing between refinishings, and each grade is supplied in a full range of sizes. Pad is self-adjusting, and can be used on any fibre brush with any disc-type machine. Finnell System, Inc.

29—CRANE ASSEMBLIES save time and costs

This series of build-it-yourself crane assemblies is introduced to provide factory-built quality cranes more economically. They include an underhung hand geared crane assembly, a top running hand geared crane assembly and both single trolley



A word about price vs. cost

When you come right down to it, a boiler is only as "cheap" as the results it gives you! A low-cost boiler that's unreliable or incomplete is the most expensive one on the market.

That's why we've always built AMESTEAM GENERATORS up to a standard, not down to a price. Throughout our 108 years of building boilers, this policy has paid off in lower-cost steam for Ames customers. It is no coincidence that so many firms specify "AMESTEAM" on the strength of its reputation for reliability and economy of operation. Ames customers are invariably "repeat" customers! They know that lower-cost STEAM rather than a lower-cost boiler is the best buy.

AMESTEAM GENERATOR

20 sizes, 10 to 600 h.p. 15 to 200# Oil, Gas or Oil-Gas Combination.

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BOX M-16 OSWEGO, N. Y.

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Please send me further information on AMESTEAM GENERATORS and name of the nearest representative.

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COMPANY.....

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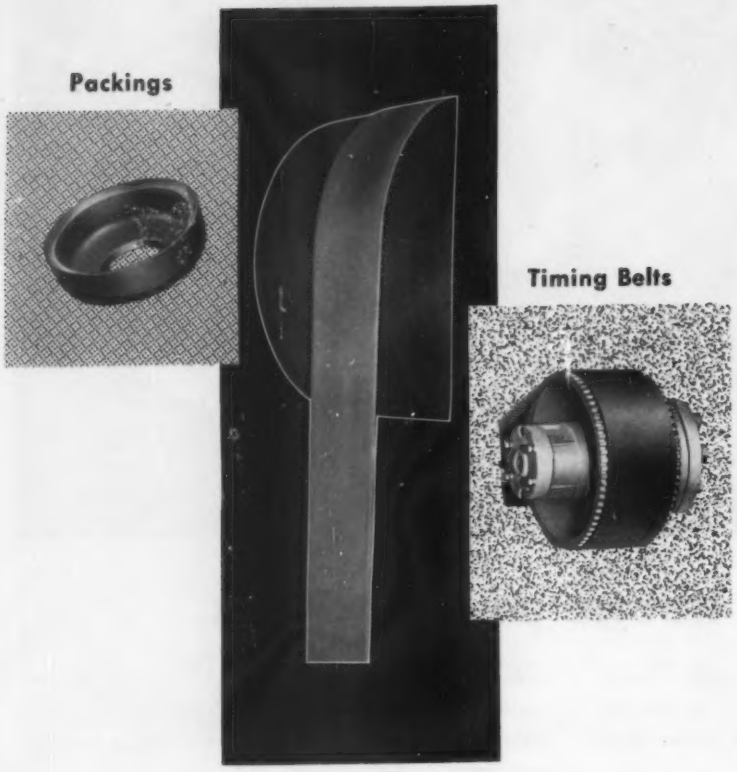
before you *Specify*

Leather Beltings

Packings



Timing Belts

stop in at Booth 822
plant maintenance show

Learn how you, too, can lower your production and maintenance costs.

RHOADS
INDUSTRIAL LEATHERS

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NEW PRODUCTS

(Begins on page 136)

and multiple trolley underhung push type crane assemblies, each available on a package basis. Assemblies are shipped with all necessary parts except I-beam and cross-shaft, which may be obtained from local steel warehouses to save shipping costs. The assemblies may be built by one man in a few hours and without special tools or skills, company announces. Underhung and top running assemblies have capacities from ½ to 5 tons. The single trolley push-type underhung cranes can be built to capacities from ½ to 1 ton, while the multiple trolley crane assemblies range in capacity from ½ to 2 tons, and spans to 30 ft. Any assembly may be used with hand or electric hoists. Conco Engineering Works.

To receive product data circle item numbers on the handy Reader Service Cards provided on pages 181-182.

30—CONTROL VALVE for acid vapor lines

The low pressure Series R Control Valve is announced for acid vapor lines or other corrosive low pressure liquid slurry or gas applications. It was developed for uses requiring a light duty valve which could be closed with a small amount of air pressure. Valve can be operated either pneumatically or hydraulically for on-off service or as a control valve. Impulse line from instrument can be connected directly to valve body to operate valve. Valve body is aluminum, sleeve pure gum rubber, Neoprene, Buna-N, Buna-S, or butyl. Sleeve can be pulled through valve body to be replaced. Red Jacket Co., Inc.

31—REPAIR KIT for stopping winter roof leaks

Adaptable to both wet surface and low temperature applications, materials in this emergency repair kit permit remedying of roof defects upon detection—without waiting for favorable weather. The kit is claimed suitable for use in rainstorms or snowfalls and at temperatures 15 to 20 deg lower than those at which many roofing materials can be applied. Components of the kit are 55 gal of Winter Grade Wet Surface Rufferseal (heavy-bodied asbestos waterproofing); 50 lb of Wet Surface Rufferseal (plastic patching compound), a roll of Rufferseal-saturated asphalt membrane and a tough-bristled roof brush.

Made with penetrating and sealing oils, Rufferseal is said to cut through damp surfaces and adhere to the roof. Applied by brush or squeegee, it forms a smooth elastic coating that fills cracks and covers the roof with a seamless surface. Around flashings, seams and gutters or

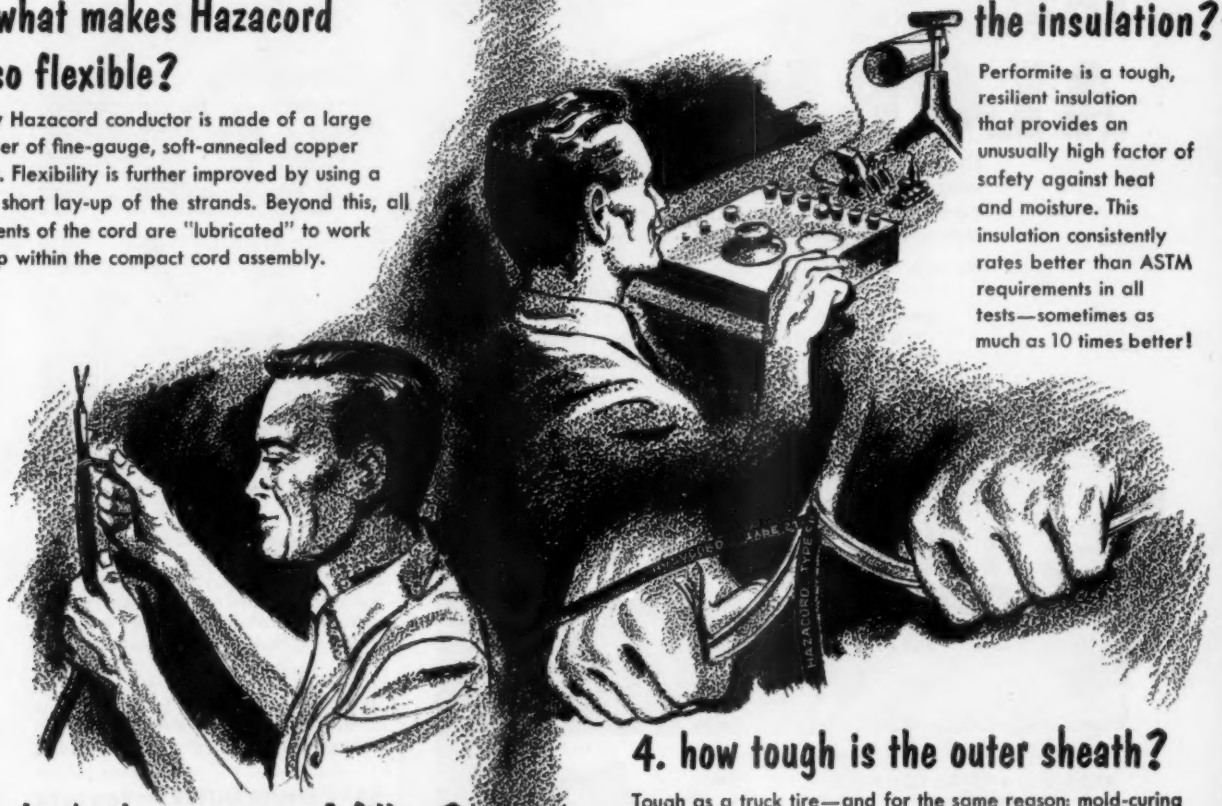
4 points about HAZACORD ...that every cord buyer should know

1. what makes Hazacord so flexible?

Every Hazacord conductor is made of a large number of fine-gauge, soft-annealed copper wires. Flexibility is further improved by using a very short lay-up of the strands. Beyond this, all elements of the cord are "lubricated" to work or slip within the compact cord assembly.

2. what's so special about the insulation?

Performite is a tough, resilient insulation that provides an unusually high factor of safety against heat and moisture. This insulation consistently rates better than ASTM requirements in all tests—sometimes as much as 10 times better!



3. what's the purpose of fillers?

They fill out the construction, protecting the insulation from damage by crushing, and give additional longitudinal strength for pulling or suspension. In Hazacord, these fillers *completely* fill in the area between conductors without lessening flexibility.

4. how tough is the outer sheath?

Tough as a truck tire—and for the same reason: mold-curing of a properly designed compound. Every foot of the specially-compounded Hazaprene ZBF Sheath is cured in a metal mold. Result: a protective sheath that's tough enough to take just about any kind of treatment in service.

3398

Complete information in Bulletin H-451. Hazard Insulated Wire Works, Division of The Okonite Company, Passaic, New Jersey.

HAZACORD mold-cured PORTABLE CABLES

PRODUCT OF OKONITE RESEARCH

For more facts circle 591 on Reply Card

The ARCHITECT knows that

ALGRIP

the *only* abrasive rolled steel floor plate in the world—means utmost safety against slipping accidents in any industrial plant . . . even on wet, greasy or oil-splashed floors or ramps.

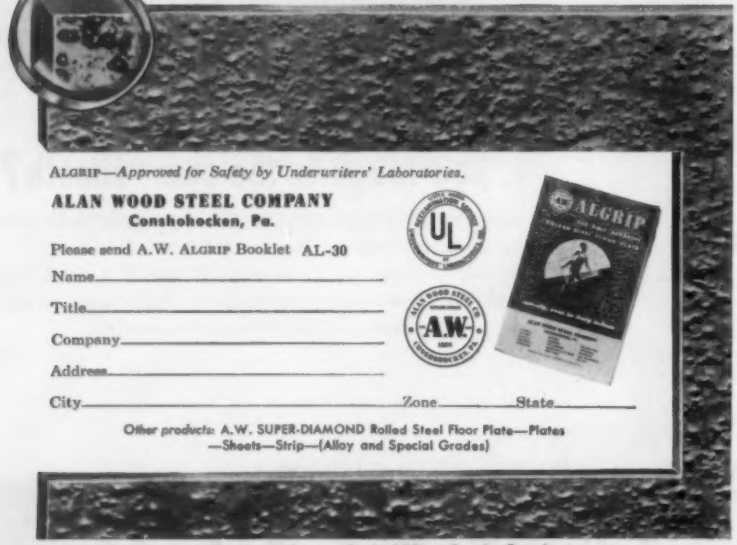
He also knows . . .

—that ALGRIP's depth-controlled abrasive penetration of its rolled steel base . . . assuring a safety surface self-renewed against the hardest wear . . . means greater . . . constant . . . and lasting . . . safety of your workers' lives.

—that ALGRIP is approved for safety by the Underwriters' Laboratories.

A.W. ALGRIP Abrasive Rolled Steel Floor Plate *puts your business on a firm footing.*

A.W. ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE



ALGRIP—*Approved for Safety by Underwriters' Laboratories.*

ALAN WOOD STEEL COMPANY
Conshohocken, Pa.

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Name_____

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Company_____

Address_____

City_____ Zone_____ State_____

Other products: A.W. SUPER-DIAMOND Rolled Steel Floor Plate—Plates —Sheets—Strip—(Alloy and Special Grades)

For more facts circle 592 on Reply Card

NEW PRODUCTS

(Begins on page 136)

on the roof surface itself, where sizeable breaks occur, Ruffersealit and membrane are used preparatory to a final topping with Rufferseal. The Monroe Co., Inc.

32—IMPROVED DRIVE aids in automation applications

With this latest model of company's Pulsing Drive, variable inching, as well as continuously fast travel, is claimed to be achieved on electric motors of any type or characteristic from fractional to 25-hp or more and by non-skilled operators. Single-knob control is designed to permit accurate positioning by varying rate of inching to a degree unobtainable with many pushbutton systems. The device weighs less than 3 lb, measures 4 by 4½ by 6 in. Yardney International Corp.

33—PERSONNEL CARRIER for interplant transportation

Designed for interplant travel, this electric personnel carrier has a capacity of 2000 lb, with a deck 54 in. long by 40 in. wide, only 9½ in. off the floor. Its

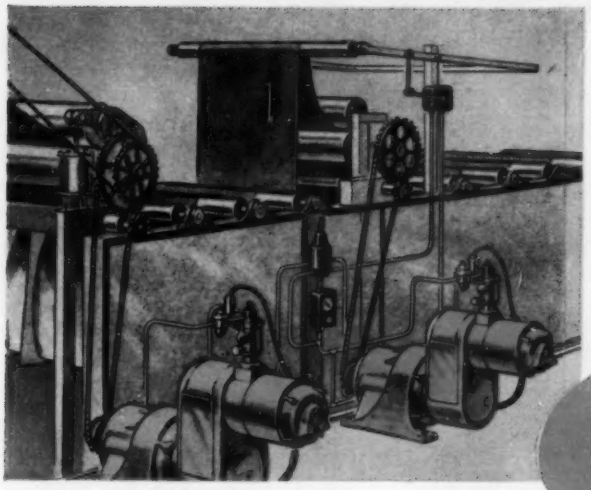
top speed is 6 mph with a capacity load. For plant tours, four removable air cushion seats are furnished. The guide or operator can stand or sit on battery compartment. With controls for the three speeds and braking on the floor, the operator's hands are free for maneuvering, and, since the truck is battery-powered, its drive is quiet and fume-free, it is noted. With seats removed, freight can be hauled. Lewis-Shepherd Products, Inc.

34—DEHUMIDIFIERS feature accessibility

Central station type sprayed coil dehumidifiers featuring heavy construction and ease of maintenance have a door on the air-output end to provide quick access to coils, drain trough and tank in that area. The coils themselves are removable from either the connection box side or from the air-intake or air-output end of the unit. Eliminators are also removable. Spray nozzles, float valve, strainer, coil face, drain troughs and tank are accessible through air inlet end.

The new units come in standard arrangements having one, two or three

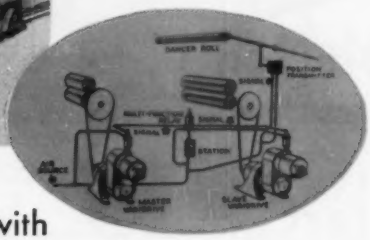
automation in action



EXAMPLE:

SYNCHRONIZATION

Speed of "master" Varidrive is set to desired speed of material. The floating or dancer roll in this process maintains a constant tension. Movement of dancer roll signals "slave" Varidrive to produce proper speed for take-up material.



Accomplishing Automatic Control with VARITROL as a component of the U. S. VARIDRIVE

By controlling motor speeds with the Varitrol as a component of the U. S. Varidrive motor, speeds can be automatically changed in response to a signal without human attention for precision-control operations. Above is shown just one of the many ways in which Varitrol automatic control of U. S. Varidrive motors can be used for automatic production control. Varitrol applications obtain efficiency and economy in industrial processes through outstanding savings in processing material, fuel and labor costs.

ADAPTABLE FOR A VARIETY OF DUTIES:

- Constant Pressure
- Proportional flow
- Constant Liquid Level
- Program Control
- Multiple Motor Control
- Filter Control
- Machine Tools
- Constant Cutting Speed
- Speed Control
- Rewind Control
- Constant Flow
- Constant Temperature

Send for Information — 8-Page Full Color Booklet On Automatic Control

PLE-1

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U. S. VARIDRIVE
WITH VARITROL®
AUTOMATION WITH VARIABLE SPEED

For more facts circle 593 on Reply Card

How to select the right liquid meters

. . . to save time and ingredients, with closer quality control, and more accurate cost accounting. That's the subject of this helpful free bulletin. It covers meters for measuring hot and cold water, oils, syrups, brines, soap solutions, and many other chemical solutions that can be handled by composition bronze meters. Illustrates sizes from ½" to 6", with rates of flow to 1000 gpm. Registers range from simple counters to the newest Auto-Stop automatic batching meters. A gold mine of information for any processing engineer. Bulletin 566UPE.

Acetate, Amyl
Acetate, Butyl
Acetate, Ethyl
Acetate, Lead
Acetone
Alcohol, Amyl
Alcohol, Ethyl
Alcohol, Methyl
Ammonium Nitrate Solution
Ammonium Sulfate Solution
Asphalt, Liquid
Banana Oil
Barium Chloride
Benzol
Boiled Oil
Borax Solution
Brine
Bronzing Liquid
Bunker "C"
Butanol
Calcium Chloride Brine
Carbon Bisulphide
Carbon Tetrachloride
Castor Oil
Cellulose Solvent
China Wood Oil
Chloropicrin
Chocolate
Cleaner, Asphalt Tile
Cocoa Butter
Coconut Oil
Code Rubber Oil
Coffee
Condensate
Corn Molasses
Corn Syrup
Cotton Seed Oil
Crude Oil
DDT
Dextrine Solution
Diacetone
Dibutyl Phthalate
Diethyl Carbitol
Diethylene Glycol
Diethyl Hexyl Phthalate
Dimethyl Phthalate
Dioctyl Phthalate
Dope (Nitrocellulose)
Esther Gum Oil, Drying
Ethyl Cellosolve
Ethylene Glycol
Fish Oil
Formaldehyde
Freon
Fuel Oil, Hot
Glucose
Glue, Water Solution
Glycerine
Grease
Ink, Oil Vehicle
Ink, Water Vehicle
Isobutylene
Isopropanol (Isopropyl Alcohol)
Kerosene
Lacquer
Lime Water
Linseed Oil
Liquid Soap
Liquid Sugar
Lubricating Oil, Hot
Lubricating Oil
Mesityl Oxide
Methylated Spirits
Methyl Bromide
Methyl Cellosolve
Methyl Formate
Methyline Chloride
Mineral Oil
Mineral Spirits
Molasses
Monochlorbenzoil
Naphtha
Nitrocellulose Lacquer
Oleic Acid
Oleum Spirits
Orthodichloro Benzine
Paint
Paraffin Oil
Paste
Perfume
Petrolatum
Pine Oil
Plasticizer
Polymer, Molten
Potassium Carbonate
Propylene Glycol
Pyrethrum Mixtures
Rum
Shellac, Alcohol Sol.
Silicone Oil
Silicon Tetrachloride
Size Solution
Soap Solution
Sodium Benzoate
Sodium Carbonate
Sodium Chloride
Sodium Silicate
Soy Bean Oil
Starch Solution
Stearic Acid
Stoddard Solvent
Styrene Monomer
Sugar Syrups
Tallow
Tannic Acid
Tire Compound
Trichlorethylene
Tricresyl Phosphate
Tungwood Oil
Turpentine
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Whiskey
Wine
Xylol

148 INDUSTRIAL LIQUIDS ARE LISTED . . . How many of these can you handle better with Neptune Meters?

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neptune liquid meters

For more facts circle 594 on Reply Card

NEW PRODUCTS

(Begins on page 136)

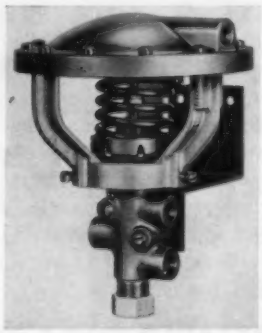
coils high and from four to eight coil rows deep. Finned tube length can vary from 2 to 10 ft; coil face area from 4 to 83 sq ft; and capacity from 2300 to 45,900 cfm. Face and by-pass dampers are available as an optional accessory. American Blower Corp.

35—WIRE GUIDES make wire pulling jobs easier

Like an extra pair of hands on the job! That's the claim made for Wire Guides, which are available in ½, ¾, 1, and 1¼ in. diam. Guided by a tempered steel spring, several conductors slide into conduit smoothly and easily without kinking, following bend formed by the wire guide. There are no skinned wires—no skinned knuckles, says manufacturer. Positioned by a few turns of threaded fitting onto threads of conduit, guide will not slip off under the hardest pull, company notes, yet can be removed quickly with a single twist. Guides are intended for use with all types and sizes of boxes, in any position, with plaster rings on or off. Ideal Industries, Inc.

36—SWITCHING VALVE is pneumatically operated

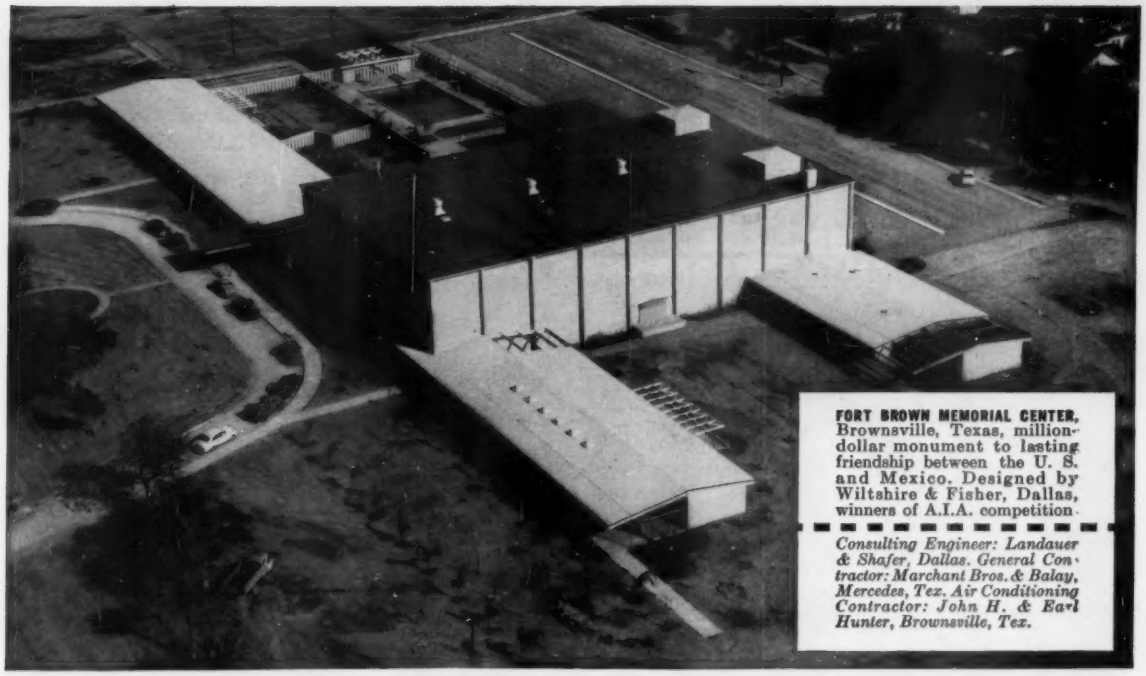
The V-132 Switching Valve is announced as a pneumatically operated unit for use with dual pressure pneumatic control systems. This three-way valve will switch automatically on a dual supply pressure



change, eliminating need for a separate air line from a central station. Use of the V-132 for unit ventilator control is said to reduce installation time and cost and eliminate need for a second pressure-electric switch and solenoid air valve. The three pipe connections are normally open, normally closed and common. The V-132 is described as simple in construction, lightweight, compact and supplied with a universal bracket for mounting in any position. Johnson Service Co.

37—LUBRICATING KIT holds assortment of oil cups

For replacement and plant maintenance purposes the Lubrikit provides a boxed assortment of 95 oil cups of 29 different



FORT BROWN MEMORIAL CENTER, Brownsville, Texas, million-dollar monument to lasting friendship between the U. S. and Mexico. Designed by Wiltshire & Fisher, Dallas, winners of A.I.A. competition.

Consulting Engineer: Landauer & Shafer, Dallas. General Contractor: Marchant Bros. & Balay, Mercedes, Tex. Air Conditioning Contractor: John H. & Earl Hunter, Brownsville, Tex.

IT'S AIRTEMP *AIR CONDITIONING IN PRIZE-WINNING FORT BROWN* memorial center

HERE'S MORE EVIDENCE OF TREND TO AIRTEMP AMONG LEADING U. S. ARCHITECTS!

Airtemp air conditioning is *famous* for trouble-free performance—just the smooth-running result you'd expect from 21 years of advanced engineering by Chrysler. And when you install Airtemp, you're giving your clients the best assurance of low operating costs—year after year.

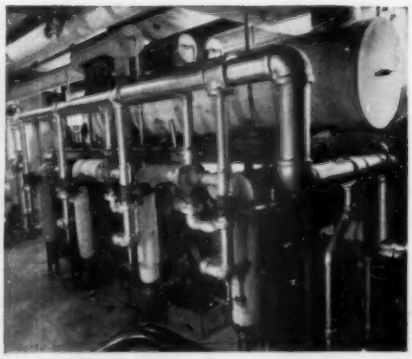
Whether your job is large or small, in the complete Airtemp line of equipment for all systems of modern air conditioning, you will find the *exactly right* equipment for every requirement.

When you air condition with Airtemp you can make *doubly* sure that your installations are right in every detail by utilizing the advisory services of *top engineers* of Airtemp Construction Corporation. And to safeguard your installations through the years ahead, there are Airtemp-trained *personnel* and service *facilities* right on the spot in every major community.

So remember, next time you're planning commerical or industrial air conditioning . . . specify AIRTEMP. Get the best equipment for the job *plus* the complete air conditioning service that will relieve you of many problems.

AIRTEMP BUILDS AIR CONDITIONING TO FIT ANY REQUIREMENT!

For full information on what Airtemp offers you, write to: Airtemp Construction Corporation, Dayton 1, Ohio



250 TONS OF COOLING! Two Airtemp Liquid Chilling systems provide water for cooling cycle in air conditioning of Fort Brown Memorial Center. Heart of each unit is the Airtemp Variable-Capacity Radial Compressor with exclusive design which saves space, reduces compressor weight. Quiet operation is due to perfect balance and reduced vibration.

Airtemp
CONSTRUCTION CORPORATION
SUBSIDIARY OF CHRYSLER CORP.

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BEFORE YOU BUY ANY STEAM TRAP...

LOOK INSIDE THE CASE!

YOU'LL FIND FIVE ECONOMY FEATURES EXCLUSIVE WITH SUPER-SILVERTOPS

GUIDED BUCKET. Inverted bucket is guided on a patented center-tube. Results in longer life as bucket cannot become damaged. Guarantees positive leakproof seating of valve.

ECONOMICAL SERVICING. Instead of removing trap from a pipe-line, you can open and service a Super-Silvertop in the line, since all connections are in the head.

EASIER INSTALLATION. Only Super-Silvertops can be installed straight in line or as an elbow in any size. Conventional bottom-inlet traps require more fittings and longer installation time.

SUPERIOR DESIGN. Super-Silvertops have simplified piping without thin-walled passages. Other traps have built-in piping which results in narrow, hard-to-clean passages that cause gaskets to blow.

ANDERLOY VALVE AND SEATS. Developed by Anderson to combat the erosive effect of steam. Eliminates replacement of valve and seat assemblies.

THE NEW WAY Notice the simplicity and saving in fittings.

THE OLD WAY Notice how bottom inlet requires complicated piping.

FREE TRAP SELECTOR BOOKLET! Tells how to select and install traps for all steam equipment. For your free copy, fill out and mail this coupon to:

The V. D. Anderson Co., 1939 W. 96th St., Cleveland 2, Ohio

Name _____

Company _____

Address _____

City _____ State _____

ANDERSON SUPER-SILVERTOP STEAM TRAPS

The Engineered Steam Traps

For more facts circle 596 on Reply Card

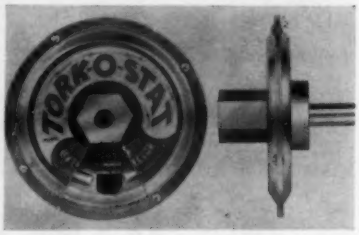
NEW PRODUCTS

(Begins on page 136)

types. These are the oilers most used for these purposes, as shown by manufacturer's sales records. Each type of oiler comes in its own separate bin within the kit, and the contents of each bin are described on the inside of the cover. The kit is being introduced at less than $15.00. Gits Bros. Mfg. Co.

38—OVERLOAD PROTECTOR guards against jamming

Type S Tork-O-Stat is a slip-clutch overload protector designed to safeguard machines against damage and time loss resulting from overloading and jamming. It has a hub on one side for double setscrew connection to the drive shaft, and



a shaft extension, mounted in a needle bearing, on other side for mounting pulley, sprocket, gear, or flexible coupling. Self-contained unit is easily installed between a driving and driven mechanism which releases itself when an overload or jamming occurs and resets itself automatically when jam is removed. Available for 10, 15, 20, 30, 40, and 60 in.-lb torque rating it can be supplied with a variety of bore sizes. The device is declared particularly essential on packaging equipment, conveyors, screw-feeds, mixers and other units vulnerable to jamming and overloading. Price starts at about $10. Machine Accessories.

39—MILLING CALCULATOR serves a dual purpose

One side of this handy plastic calculator, designated "Milling Setup," is used for quickly determining spindle speeds and feed rates adequate for toolroom operations, job lot milling or short production runs. On the other side of the calculator, titled, "Economic Cutting Speed," a modified cutting speed can be determined which will give the minimum cost per piece for high production milling jobs. Approximately 5-by-8 in. in size, this calculator can be had for around a dollar. The Cincinnati Milling Machine Co.

40—WELDED CHAIN made of lightweight aluminum

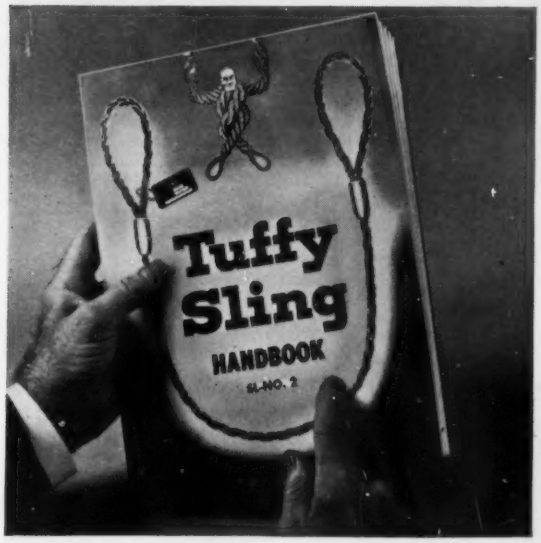
Commercial production of welded aluminum chain in ¼-, 5/16-, ⅜- and ½-in. sizes is announced. According to manufacturer, this chain requires little or no maintenance, is extremely lightweight,

Tuffy® SLING NEWS

Vol. 1 — Published Monthly in Leading American Trade Magazines by Union Wire Rope Corp. — No. 3

NEW FERRULE EYE SPLICE FEATURED

In Big, New Tuffy Sling Handbook Just Off Press-FREE



First editions of this handbook were so popular that 85,000 copies circulated to sling users. If you use or buy slings—if you're a plant engineer, safety engineer or purchasing agent—you'll find this new, enlarged edition of the Tuffy Sling Handbook the most comprehensive ever published.

It tells you all about the new factory-fitted slings added to the Tuffy line. It shows why the new Tuffy pressed-on ferrule makes Tuffy slings faster, safer, and easier to load and unload than ever before. Many of the fittings—clamps, hooks, bridles, thimbles, saddles—are new, too. And this latest edition of the Tuffy Sling Handbook contains a host of other useful information: a complete rigger's manual, proof tested ratings and specifications for all Tuffy Slings; a new engineer's notebook; data tables on a full line of versatile, easy-to-apply sling fittings.

But don't delay to order your *FREE* copy. Mail the coupon to us now. We'll send it to you by return mail with Tuffy's compliments—nothing to buy, no obligation. Hurry. The supply is limited!

YOU CAN'T HURT A TUFFY SLING

Loop it, pull the loop taut. Tuffy's 9-part machine braided wire fabric construction resists kinking. But if you *are* able to kink it, you can straighten it out quickly and without materially damaging the fabric.

New Tuffy® Ferrule Makes Sling History

It's on all Tuffy Slings, but it doesn't cost you a penny extra. There's no sling ferrule like it anywhere. Tuffy's streamlined metal ferrule is set on the eye splice under pressure so great that the inner metal virtually flows into the voids between the wire fabric. A force of friction is created so great that the eye splice has strength equal to that of the famous machine braided Tuffy wire fabric. It makes Tuffy Slings stronger. It makes them safer: The ends of the tapered ferrule are swaged tightly to the fabric leaving no edges to hang up on loads or to injure workers' hands in hitching to and unhitching from sling loads. There's still another advantage—because Tuffy Slings are easier and safer to load, they're also faster to load. Your men can do more work when they're working with Tuffy® Slings.

CONSULT YOUR DISTRIBUTOR

when you want to buy Tuffy Slings or Tuffy Hoist Lines. Give him your requirements. He'll stock an inventory for you to draw against. It saves you time and money.

New Tuffy® Ferrule

has no sharp edges to injure hands or catch on loads. The tapered and rounded ends are swaged tight to the sling fabric. The tremendous pressure at which the ferrule is pressed around the machine braided wire fabric flows the metal into the voids of the eye splice and gives the eye splice 100 percent of the strength of the fabric.

union Wire Rope corporation

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

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COMPANY NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____ 14

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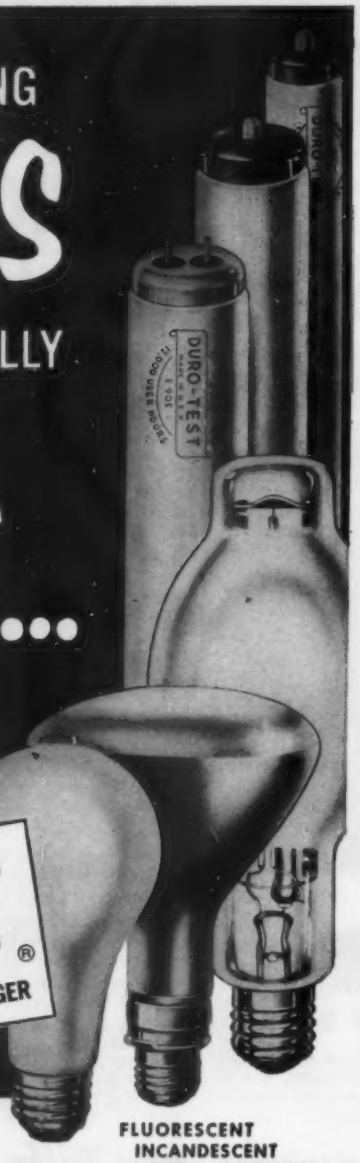
BUILT STRONGER TO BURN LONGER



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MERCURY VAPOR

Here's why:

Duro-Test lamps are America's best . . . exclusively designed for heavy industrial and commercial service.

Operating at their rated watts and volts, they far outlast conventional lamps, yet maintain high lumen output throughout life.

Results? These stronger-built, longer-burning lamps reduce your overall lighting costs. Our representative in your area will show you how. WRITE NOW TO—

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WAREHOUSES IN PRINCIPAL CITIES FOR PROMPT SHIPMENT

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NEW PRODUCTS

(Begins on page 136)

has unusual non-sparking and non-magnetic characteristics, and excellent resistance to corrosion. Size for size, its working load limit is about 60 per cent that of welded steel chain, it is pointed out, and its weight is 65 per cent less. The McKay Co.

41—MAGNETIC BRAKE for the 50 to 100 hp range

Design improvements in the H Style 1200 Series Magnetic Brake have reduced brake dimensions with no decrease in torque rating. Up to 5¾ in. less clearance is required for housing removal. The diameter has been reduced 2 in. and the brake length shortened. Four torque ratings are available: 230, 345, 460 and 575 lb-ft. The brake may be supplied for motor or floor mounting and may be arranged to operate on a-c or d-c. Stearns Magnetic, Inc.

42—SINTERED FILTER for fluids up to 1000 F

For handling fluids ranging up to 1000 F, this filter can take flow rates comparable to any high temperature filter with lower differential pressures and a better degree of filtration, according to manufacturer. Made of sintered metal, the filter is claimed to remove particles as small as a micron from a wide range of fluids, including nitric acid, hydrochloric acid, sulfuric acid, phosphoric acid and strong alkalies. The one-piece sintered element can be made in a variety of diameters and lengths and its radial fin construction can be supplied in specified depths and numbers of convolutions to give extended area within a confined space. Varying flow rates are available. Filters can be stainless steel, Monel, other metals. Purolator Products, Inc.

It's easy to obtain product data with the postage-free Reader Service Cards provided on pages 181-182. Use them for information on advertised products, too. Just circle the key number appearing at bottom of the ad.

43—PIPE HANGERS are high deflection units

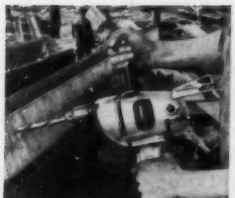
Finnflex Types S and SC Steel Spring Vibration Hangers are designed to prevent transmission of noise and vibration from suspended equipment and to flexibly support piping systems. The units consist of a helical steel spring enclosed in a steel housing. The springs are carbon-steel wire with cadmium plating to prevent corrosion. Company says they stand high temperatures without creep

Black & Decker® Electric Tools are POWER-BUILT TO CUT COSTS!

Service... one of 42 B&D factory service branches is located "next door" to you. Staffed by experts to give fast, efficient service, genuine replacement parts.

We don't buy motors—we build them!

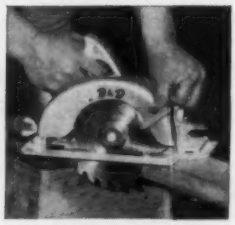
The *heart* of your electric tool is the motor—completely built by Black & Decker! All the power you need *and then some*—because each motor is built for a specific tool and the job it must do! B&D motors always *stand up!*



DRILLS-32 models

VACUUM CLEANERS-1 model

BENCH GRINDERS-4 models



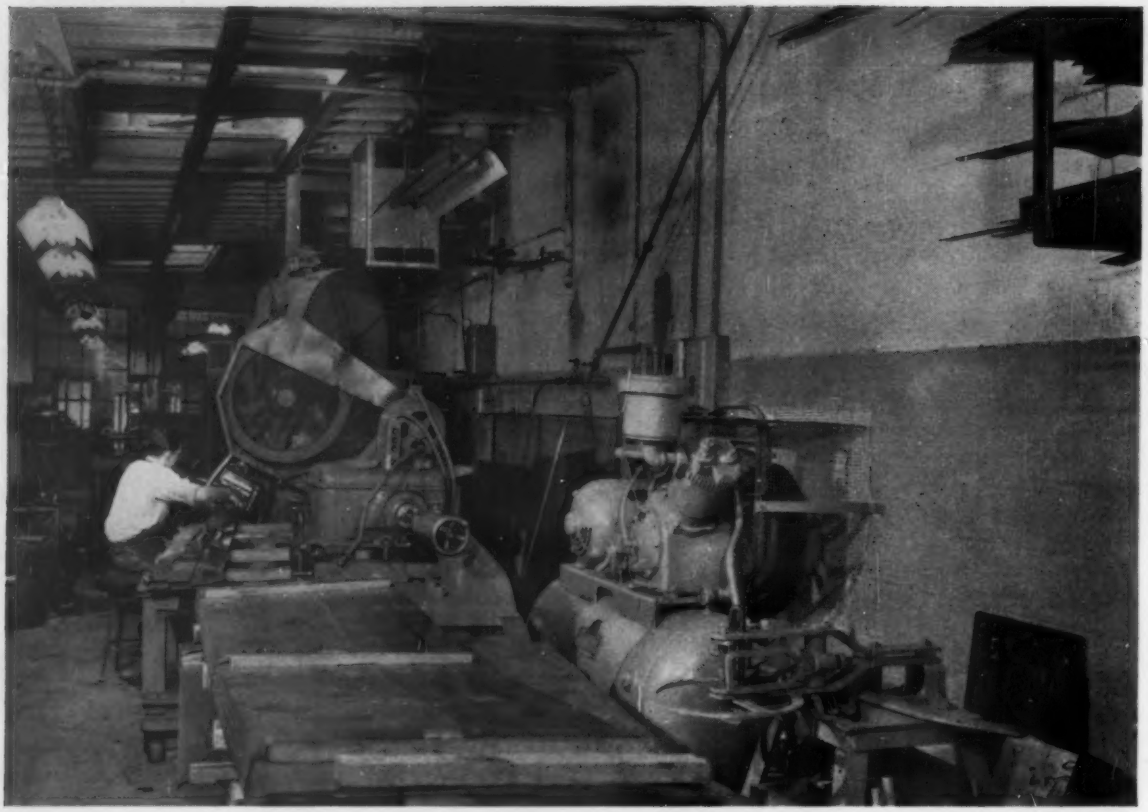
SAWS-5 models

B&D tools are *power-balanced* for greater speed, power and accuracy—which means faster, better production, lower costs. B&D tools, because of their lightweight and compact design, guarantee reduced operator fatigue. And B&D tools are *Power-Built* to last—like this B&D Sander, which is versatile enough for all your most exacting finishing jobs . . . sanding, grinding, burnishing, cleaning . . . stands up easily under 'round-the-clock operation—and will go on like this, cutting your costs, *for years!* See your B&D distributor today or write for free catalog to: THE BLACK & DECKER MANUFACTURING COMPANY, Dept. 1501, Towson 4, Maryland.

LOOK IN THE YELLOW PAGES UNDER "TOOLS-ELECTRIC"

B&D Black & Decker®
PORTABLE ELECTRIC TOOLS

For more facts circle 599 on Reply Card



Punching Out Extra Profits

Dependable Westinghouse Air Compressor supplies versatile, economical air power to raise production and lower costs

That's just what the operator of this punch press is doing — punching out the extra profits that result from increased production.

And it's a Westinghouse Air Compressor that's responsible for his greater output.

Why? Because Westinghouse Air Compressors have 15 features not found in any other compressor — features that mean greater dependability and greater efficiency for low-cost operation. Here they are:

Type M inlet filter, disc valves, enclosed crankcase, anti-friction main bearings, pressure lubrication, low oil level protection, enclosed starting unloader, adequate cooling fins, "Y" type construction, high velocity fly-wheel fan, large size intercooler, thermal overload protection, greater weight, dual control, and one-year warranty period.

Let compressed air help you punch out those extra profits with its versatility. And guarantee yourself a trouble-free source of supply by using Westinghouse Air Compressors. Sizes up to 40 hp — write for latest literature.

W-102

LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 1, Wisconsin

PORTABLE AIR COMPRESSORS

TRACTAIR

STATIONARY AIR COMPRESSORS

AIR TOOLS

ENGINES

For more facts circle 600 on Reply Card

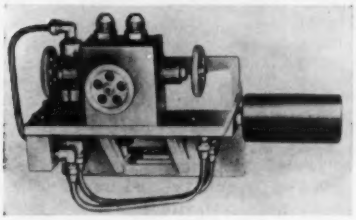
(Begins on page 136)

or permanent set, and low temperatures without increase in stiffness.

In both types available, the suspended load is transferred to the isolating spring by rods or bolts with washers that rest on the bearing plates which enclose the isolating medium. The top bearing plate is capped with a rubber isolation washer to minimize noise transmission; and at the bottom of the steel housing is a rubber damper washer to limit excursion at resonance. The units are intended for use where large deflections are required due to thermal expansion of pipe lines, where high and low temperatures are involved and where low disturbing frequencies are encountered. Rated load capacities range from 50 to 1000 lb. T. R. Finn & Co., Inc.

44—TRANSMITTER measures pressure differences

The Delta P Transmitter—a linear, force-balance instrument for pneumatically transmitting measurements of large pressure differences over standard distances—is capable of measuring pressure differences up to 300 psi. According to company, it fills the measuring gap existing when pressure differences exceed



capacity of standard instruments. Company recommends this instrument for measuring pressure differences between steam header and boiler feedwater, and for measuring pressure drop across superheaters, between steam header and turbine throttle, or across high pressure heat exchangers. General uses include measuring pressure differences between stages of high pressure multistage hydraulic pumps, or as a square root meter. It is usable at static pressures up to 3,000 psi.

Transmitter receives two input pressures and converts pressure difference into a single pneumatic output pressure directly proportional to the difference. Assembly includes three pressure chambers, each containing a flexible bellows, mounted on a fulcrumed beam. Shutoff and bypass valves are built in. Bulletin MSP-130 gives details. Hagan Corp.

45—ENCLOSED MOTORS for damp and dusty areas

Improved rerated totally enclosed non-ventilated and totally enclosed fan cooled motors, the Type H, conform to new NEMA dimensional standards. They are more compact than previous design, utilize

For Removal of Dust, Fumes, Gases, etc.,

flexible

Spiratube

does the job better . . .
cuts maintenance costs!

Lightweight Spiratube® is the answer to many an application where fume removal, ventilation and dust problems are concerned. Because of its patented preformed helical wire support design, Spiratube "springs to work" and stays extended even on tight turns . . . costs less to install and maintain—downtime is reduced to a minimum—and Spiratube can snake around and over obstructions, eliminating the use of costly elbows and fittings.

Spiratube is ideal for portable and semi-permanent applications. Sections can be linked together or detached in a matter of seconds without the use of tools. If machine changes are made, Spiratube can be assembled and disassembled and reused over and over again.

Spiratube is available in sizes from 3" to 30" in a variety of covers. Investigate this low-cost method of air or dust handling today. Stocks are available from leading distributors across the country. For further application information about this product, please send coupon below.

•

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Please send me illustrated catalog and more information on Spiratube.

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Title and Company _____

Address _____

City _____ Zone _____ State _____

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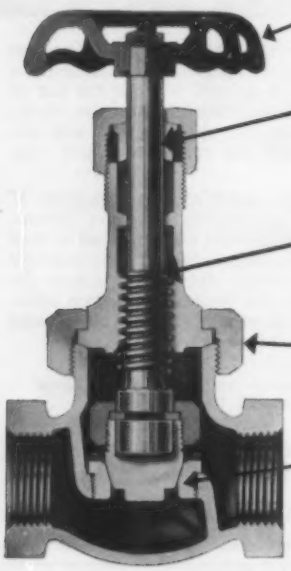
THE KENNEDY "500 BRINELL"

Bronze Globe and Angle Valves *with* Stainless Steel Seats and Discs

KENNEDY'S "500 Brinell" valves set a new quality standard in valve design, engineering and performance. New, rugged construction features cut your maintenance costs because KENNEDY'S "500 Brinell" valves give you longer service life on your toughest jobs. Specially-treated, super tough stainless steel seats and discs give you leakproof performance because they banish common valve enemies. Check these new built-in quality features and see why KENNEDY gives you the greatest valve value:

TWO DISC TYPES { FULLWAY, PLUG TYPE } TWO PRESSURE RATINGS { 200 lbs., 300 lbs. }

Fig. 138S	200 lbs.	Fullway	Globe	¼" to 2"
Fig. 139S	200 lbs.	Fullway	Angle	¼" to 2"
Fig. 138PS	200 lbs.	Plug Type	Globe	¼" to 2"
Fig. 139PS	200 lbs.	Plug Type	Angle	¼" to 2"
Fig. 544S	300 lbs.	Fullway	Globe	¼" to 3"
Fig. 546S	300 lbs.	Fullway	Angle	¼" to 3"
Fig. 544PS	300 lbs.	Plug Type	Globe	¼" to 3"
Fig. 546PS	300 lbs.	Plug Type	Angle	¼" to 3"



"PISTOL-GRIP" HANDWHEEL . . Fits your hand, gives you a firm, easy 3-way grip on top, sides and bottom! Full palm protection, too.

KENALLOY STEM . . . A new, exclusive KENNEDY stem material that eliminates stem failures because it removes the cause of failures.

ACME THREAD Eliminates feather-edge ends which, in ordinary valves, can break off and lock stem in the bonnet.

UNION BONNET . . . A stronger, tighter joint that easily withstands pressure and pipe wrench punishment.

STAINLESS STEEL SEATS, DISCS "500 Brinell" hardness eliminates cutting by foreign objects, pitting, erosion, corrosion and wire-drawing.

• *FOR COMPLETE DETAILS WRITE FOR NEW BULLETIN 110*

THE KENNEDY VALVE MFG. CO.
1066 EAST WATER ST.
ELMIRA, NEW YORK
VALVES • PIPE FITTINGS • FIRE HYDRANTS

OFFICE-WAREHOUSES IN NEW YORK, CHICAGO, SAN FRANCISCO • SALES REPRESENTATIVES IN PRINCIPAL CITIES

For more facts circle 602 on Reply Card

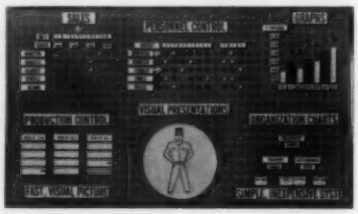
NEW PRODUCTS

(Begins on page 136)

less space and offer larger horsepower output. Housing and end-brackets are a solid cast iron ribbed frame. Designed for operation where non-combustible dust and moisture are prevalent, these motors are now in production on the 182, 184, 213 and 215 frames. Electro Dynamic Div., General Dynamics Corp.

46—CONTROL BOARD aids in visual control systems

The Magne-trol Board is of magnetic steel, and holds on its surface the visual elements that comprise the needs of the user. Visual elements may include: Alnico permanent magnets of various colors and sizes; magnetic card holders



for typed, printed or written information; larger supporting unit for pictorial presentation; acetate tape for maps, charts and graphs; graph paper; colored plastic bars for charts and graphs; circular identification stickers; magnetic arrows. You can select whichever of these elements suit your needs.

The standard board is 24 by 36 in., of magnetic steel bonded to masonite, finished in "office grey" and framed in polished aluminum. This standard model costs around $25 and can be used for production schedules, graphs and charts, service schedules, warehouse records, other purposes. To let plant engineers see how the Magne-trol can be applied to their uses, manufacturer offers a trial kit which is basically a Magne-trol Board in miniature, accompanied by all visual magnetic elements. The kit costs around $5, but this may be applied against the purchase of a full sized board. Methods Research Corp.

47—VISCOSITY CONTROLLER is pneumatic-operated

Model M8C is a pneumatic-operated viscosity controller which uses an air-operated measuring element with a control station and necessary valves to provide automatic control. An air cylinder is used to raise a piston drawing a sample into the measuring element and time required for piston to fall by gravity is a measure of viscosity. The control station measures time of fall and opens a valve to add solvent when necessary. This process control is declared particularly suitable for applications where solvent must be added to correct for evaporation losses, such as in paint fin-

PRODUCT RESPONSIBILITY

...the "extra" that's built into every

WICKWIRE WIRE ROPE SLING

Since the safety of handling crews, possible damage to costly materials or machinery, and loss of productive time all hinge on unfailing performance, the user's understanding of *product responsibility* is of vital importance in the selection of a wire rope sling. And one thing you can be sure of: there is no question as to complete dependability when you specify Wickwire.

That's because Wickwire Wire Rope Slings are products of a company whose experience goes back to 1821. The high standards adhered to in the design and manufacture of every Wickwire Wire Rope Sling and thorough testing at every step of production mean maximum safety and the utmost in service performance.

All Wickwire Slings are made from wire rope famous for its durability . . . and with fittings with matched rated capacities to make sure they live up to your every service specification.

SEND FOR YOUR FREE WICKWIRE SLING CATALOG

Write us today on your company letterhead and receive this 120-page data-packed manual free.

WICKWIRE
WIRE ROPE SLINGS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

3466

THE COLORADO FUEL AND IRON CORPORATION — Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION — Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
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FORD ASSEMBLY PLANT
San Jose, California

45 acres of fixtures at new Ford plant maintained at lower cost with UP-RIGHT aluminum scaffold-on-wheels

17 FT. SCAFFOLD ASSEMBLED
IN 2 MINUTES BY 2 MEN

You, too, can save with these rapidly assembled Up-Right aluminum scaffolds.
Write for circular • Up-Right Scaffolds • Dept. 163 • 1013 Pardee St., Berkeley, Calif.

For more facts circle 604 on Reply Card

NEW PRODUCTS

(Begins on page 136)

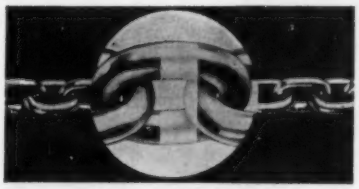
ishing, wire coating, rotogravure printing, sizing and various coating processes, providing automatic control of viscosity at a low cost. Norcross Corp.

48—CENTRIFUGAL PUMP for paper stock, other liquids

Classed as a paper stock and industrial liquids pump, this unit has a diverging type impeller which lets the pump handle liquids containing high concentrations of solids, air and gases. This impeller has a much greater area at the discharge than at the inlet, and, according to manufacturer, this design prevents vapor binding, avoids clogging, and makes the pump self-venting and self-regulating. The pump is a horizontal, single-stage centrifugal unit in sizes from 4 to 12 in., with capacities from 200 to 7000 gpm and heads from 5 to 225 ft. Form 7325 gives information on applications. Ingersoll-Rand Co.

49—LENGTH-MARKED CHAIN, color-coded for grade

To simplify handling and identification of chain, company announces its Measure Mark Chain—proof coil, BBB, high test and Cam-Alloy chain marked every 5 ft in separate colors to identify each grade.



The number of feet desired can be obtained by counting the markings. All company's proof coil chain will have a green five foot marking; BBB—red; high test steel—blue; and Cam-Alloy—orange. Color coding will provide identification of chain grade and manufacturer even though chain has become separated from its original container. Labels have been designed which feature ruled columns with these headings—On Hand and Withdrawals. A perpetual inventory can thus be maintained on the label and amount of chain in stock easily determined. Campbell Chain Co.

50—SCRUBBER cleans polished metal sheets

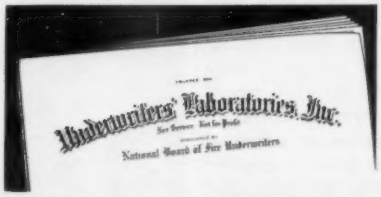
Called the Cathode Plate Scrubber, this machine removes unwanted residue resulting from the buffing of cathode plates to be coated in the electrolytic deposition process. Metal plates, suspended by hooks, are carried through the scrubber by an overhead monorail conveyor. A spray and cylindrical scrubbing brushes scour off residual material, and clear water rinses the plates as they leave the machine.

Powering the scrub brushes are two ¾-hp drip-proof motors, of the 1800

In Hazardous or Coded Areas Specify RESOLITE FIRE-SNUF The Only Fiberglass Panel Labeled by Underwriters'

Fire-Snuf Panels are the *first* and *only* translucent, fiberglass-reinforced panels to be listed by Underwriters' Laboratories, Inc. They carry the UL label as evidence that they have and are continuing to meet Underwriters' rigid specifications.

They should be specified for skylights, sidewalls, partitions and glazing where fire hazards are unusual or codes call for a flame spread rating of below 75. This rating is equivalent to the Building Officials Conference of America (BOCA) classification of "slow burning" or "fire retardant." These panels are self-extinguishing and will not support combustion.



Complete test reports on the fire hazard classification of Fire-Snuf by Underwriters' Laboratories Inc., are available from the manufacturer on request.

Made with fire-retardant Hetron* polyester resin, Fire-Snuf panels retain all the best features of standard Resolite—shatterproof safety, strength, translucence, stability and load bearing characteristics.

*Ⓡ Hooker Electrochemical Co.

Fire-Snuf is molded in flat panes for glazing and in all standard Resolite corrugations in lengths up to 13 feet and widths up to 42 inches. For additional information consult your distributor or contact

RESOLITE Corp.
Box 517, Zelienople, Pa.
Office and Warehouse, CHICAGO, ILL.
Export Office, HOUSTON, TEXAS
Distributors in principal cities, U. S. and Canada

For more facts circle 605 on Reply Card

Use SAFETY GRIP-STRUT grating

Wherever a safe footing is required

Grip-Strut circular stairway on Shell Oil tank in Portland, Ore.

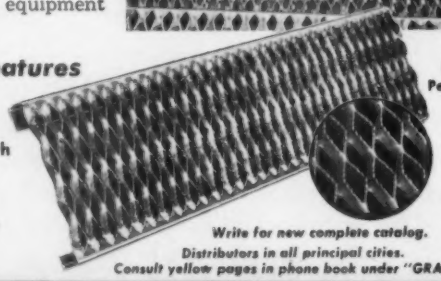
See how Shell Oil uses Grip-Strut for a safe ramp between tanks.

View looking down circular stairway on Shell Oil tank shown above.

SAFETY GRIP-STRUT is the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUT presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive NON-SKID footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

Important Safety Features

- ★ Fire proof
- ★ Slip proof
- ★ Maximum strength
- ★ Minimum weight
- ★ Easy to stand on
- ★ Cool in summer—warm in winter



Pat. Pending

Write for new complete catalog.
Distributors in all principal cities.
Consult yellow pages in phone book under "GRATING"

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THE GLOBE COMPANY • *Manufacturers since 1914*
4016 S. PRINCETON AVE. • CHICAGO 9, ILL.

For more facts circle 606 on Reply Card

NEW PRODUCTS

(Begins on page 136)

rpm, 220v, three-phase, 60-cycle type. They turn the brushes by means of a chain drive. A ¼-hp variable speed motor for the feed roll drive moves the cathode plates through the machine at a speed of 2⅔ to 8 fpm. The spiral coiled scrub brushes are 47 in. long and have stainless steel backing. Machine Div., Fuller Brush Co.

51—MECHANICAL SEALS for use on process pumps

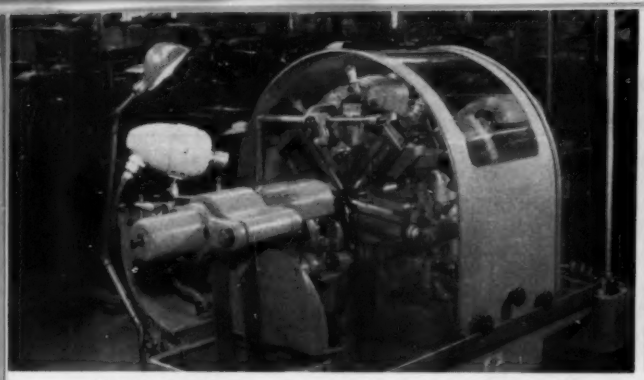
According to company, Unitary Seals have several distinct features; one-piece assembly (entire unit, including sleeve and gland, ready for quick installation); pre-set at factory; collet-type drive, no set screws to loosen; external lock drive, readily accessible; circulating connections in glands, provide cool, clean lubrication to add further life to seal; and long life, all sealing faces being precision lapped, plus all high pressure seals pressure balanced. Unitary Seals are designed for use on rotary shafts of boiler feed pumps, chemical pumps, oil refinery pumps, digestor circulating pumps and other process pumps. Bulletin AD-151 gives details. The Garlock Packing Co.

One of these products may be "just what you're looking for." Use the handy Reader Service Cards to ask for more information on it.

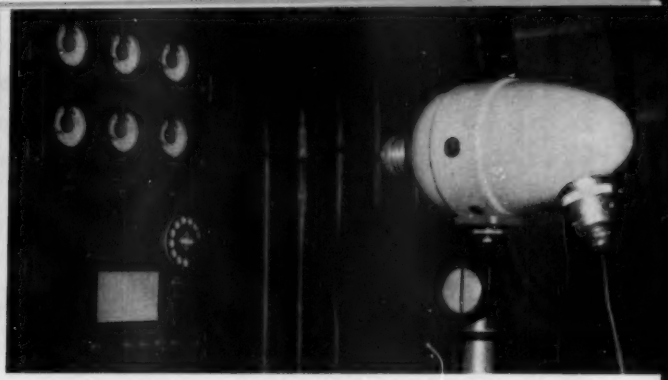
52—CONDENSER, refrigerant, capacities to 240 tons

In this evaporative type condenser the refrigerant—ammonia—is condensed in two parallel mounted coils enclosing a central plenum under the fan section. Water sprays are arranged over the coils and the air enters from above, travels downward and changes direction to enter the plenum, at which point the entrained water is eliminated. The air then moves up and out through propeller fans. Hot gas is sub-cooled before condensation by first passing through duo-pass pre-cooling coils mounted beside the fan section. A dry air stream crosses this coil, removing the super-heat. Any oil vapor is liquefied during this process and removed by a separator in the gas lines ahead of the cooling coils. This pre-cooling is also claimed to prevent the high-temperature deposit of hard scale on the coils. Only water consumed is that evaporated. Excess water is removed from the condensing coils by the down-draft air and recirculated.

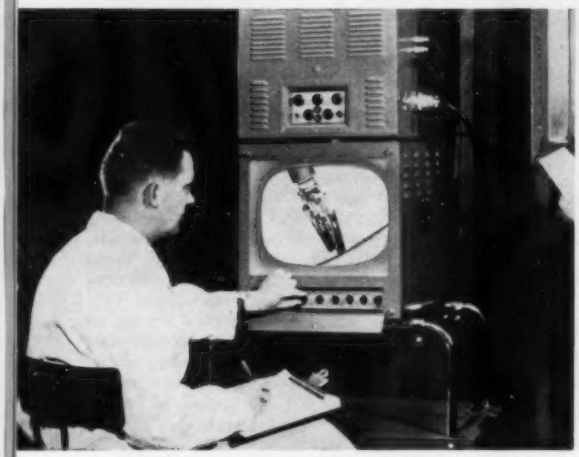
All sections of this condenser are encased in separately removable panels for accessibility. It is noted that much expense is saved by the design which permits shipment of the casing as flat panels. And in many locations, extra savings are pos-



Watching machines is a job for the GPL TV camera. Above, the GPL camera mounted to face a screw-making machine instantly reports anything needing attention to the operator, increasing the number of machines he can tend efficiently.



In automation, whenever there are dials to be checked, the GPL TV camera can report to a central point. Motorized on rails or to swing around, the camera scans a whole bank of dials, sweeps an area. Equally useful in non-automatized production.



Danger is no problem. The GPL industrial TV camera can look into the face of danger and never blink. Above it reports to the operator a hazardous process taking place inside a test cell.

Wherever security control is a problem, strategically placed GPL TV cameras multiply the eyes of your guards. Here a single camera keeps watch over vital military equipment. Similarly, GPL TV cameras can guard the aisles of warehouses, restricted areas, exposed loading platforms.

Control Problems Solved by Seeing

GPL industrial television opens up new possibilities in control by providing instantaneous visual information on what's happening.

Good control is based on good information. And for many purposes no information can match seeing what is happening right on the spot. You can do just this, anywhere, anytime, with the industrial and institutional television equipment designed and made by General Precision Laboratory Incorporated, and known as GPL ii-TV.*

No spot is too far away, too dangerous, too cramped for GPL ii-TV. Unattended, the camera permits observers to see around corners, through walls, across thousands of miles, within the whirling heart of a machine. It can bring many scattered events to a single observer and, with GPL TV projectors, a single event to many scattered audiences.

With this new tool you can solve many kinds of control problems. You can use GPL industrial television to monitor remote machines. You can study a wing tip five miles up, or watch a grapnel grope along the ocean floor. You can follow and control a dangerous process, step by step, safe from fumes or radiation. You can control access to restricted areas, check signatures against a master file.

In fact, you can use GPL industrial television for anything that requires instant communication of visual information. You can improve skills and techniques of workers in scattered plants with visual demonstrations. You can run face-to-face conferences of far-flung personnel.

A GPL Industrial and Institutional Television System can do all these things for you—and many others—with high efficiency and low cost. Here's why:

* Trade-mark

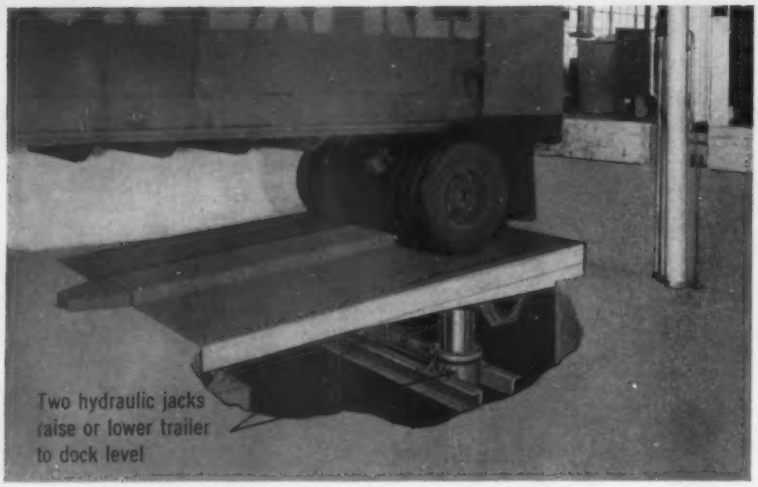
- It is high-sensitivity, quality equipment. Behind it lies the long experience of General Precision Laboratory in building the finest in broadcast television. GPL equipment is used by 90 percent of all studios equipped for video recording; GPL cameras and controls are found in many of the finest broadcast TV installations.
- Military TV equipment must be really rugged—and GPL has been building it for years. Now GPL has designed your industrial TV system with high-strength elements and simple design that stand the gaff. Special housings protect the camera from weather, heat, shock, explosions.
- GPL's compact industrial camera is bullet-shaped to squeeze in almost anywhere. Only 2" larger in diameter than a baseball, it weighs 5 lbs. The 26-lb. control cabinet, the size of an overnight case, can be far from the camera.
- GPL's industrial camera is unique in its ability to obtain a good picture at very low light levels. With its Vidicon pick-up tube it can work under highly adverse conditions.
- GPL enables you to multiply your audience with a TV projection system for industrial use. It is made like the famed GPL theatre projectors used all over the country; mounted on rollers for complete mobility.

For more information on what GPL ii-TV can do for you—and suggestions on your special problems—write to: GENERAL PRECISION LABORATORY INCORPORATED, Pleasantville, N. Y. (A subsidiary of General Precision Equipment Corporation.)

For more facts circle 607 on Reply Card

NEW ROTARY TRUCK LEVELER

saves loading costs and dock space



Two hydraulic jacks raise or lower trailer to dock level

HANDLES ANY HIGHWAY CARRIER AT ANY LOADING DOCK

- Quickly levels any truck bed at dock height so pallet trucks and other materials handling equipment can move in and out with maximum speed and safety.
- Takes no space . . . installed in driveway in front of dock, leaving dock platform completely free of obstructions.
- 40,000-lb capacity, 24″ travel . . . handles any highway carrier at any loading dock.
- Raised center curb section guides wheels onto runways for fast, accurate truck positioning.
- Dependable, economical hydraulic operation by Rotary Oildraulic electric power unit.

For new or old buildings

The Rotary Truck Leveler is easily, inexpensively installed in any building. It is the ideal equipment for docks where construction or space limitations prevent use of ramps. Changes in materials handling systems or equipment will never make the Rotary Truck Leveler obsolete. Mail coupon below.

Rotary

Truck Leveler

Manufactured by
ROTARY LIFT CO., MEMPHIS 2, TENN.

Specialists in oil-hydraulic lifting devices.

Mail coupon for new catalog

Rotary Lift Co.
1150 Kentucky
Memphis 2, Tenn.

Send complete data on the Rotary Truck Leveler to:

Name_____

Address_____

_____

For more facts circle 608 on Reply Card

NEW PRODUCTS

(Begins on page 136)

sible by building a concrete spray pan on the site. There are four sizes: 90, 120, 180 and 240 tons. The ratings are for ammonia, but the condensers are also applicable to Freon. Niagara Blower Co.

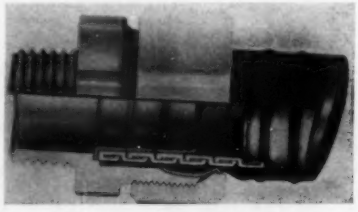
53—BRONZE VALVES, solder end, in five types

This line of solder end valves includes three gate valves — rising stem with double-wedge disc, rising stem with solid-wedge disc, and non-rising stem with single-wedge disc—all rated at 125 lb steam pressure and 200 lb WOG. Also available in the same pressure ratings is a swing check valve with renewable disc and side plugs. The line is completed by a non-metallic-disc globe valve, rated at 150 lb steam and 300 lb WOG. The valves embody such features as company's non-slip handwheel, Stemalloy stem, hexagon head gland, and back seats permitting repacking under pressure. They have plain ends for use with Types K, L, and M copper tubing. Connections are made by a soldering operation.

These valves are suggested for use on plumbing, heating, and air conditioning lines; low pressure steam service; underground water lines; condensate return lines; liquor lines in breweries, distilleries; dye lines. Lunkenheimer Co.

54—CONNECTOR for flexible liquid tight conduit

Called Liquid Tight, this connector features one-piece construction to permit installation without disassembling the unit. Installation simply requires loosening the nut, inserting the conduit and tightening. The connector also offers positive grounding, discernible by a



"click" which can be heard and felt when the conduit is inserted. As explained by manufacturer, this occurs because of the design of the brass grounding insert which has convolutions to match those of the liquid tight conduit. When conduit is inserted, these convolutions meet to produce the audible click. Further assurance of a positive ground, even when the conduit's inner diameter varies on the plus side, is claimed to be provided by the action of the nut which closes down the diameter of the conduit to produce contact with the grounding insert. Liquid Tight's sealing action is achieved through a brass sealing ring which is an integral part of the connector and

NEW PRODUCTS

(Begins on page 136)

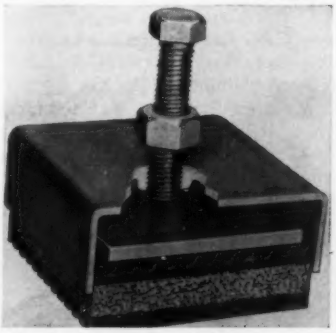
never removed. The connector comes in sizes for straight, 45- and 90-deg connections. Electrical Fittings Corp.

55—PUMP OILER for heavy machinery

This 2-qt hydraulic pump oiler can deliver a full stream or one drop of oil, and is available with either vertical, angle or flexible spouts—all interchangeable. All pump parts are renewable. A controlled-measure attachment can be fitted on the handle, at additional cost, to provide a quick, accurate means of controlling oil ejected. Eagle Mfg. Co.

56—VIBRATION DAMPER eliminates floor bolting

Lev-Elasto Damper, an adjustable leveling mount, is announced as an effective vibration and shock isolating damper. By eliminating anchor bolts and shims, it adds mobility to heavy equipment, it is pointed out, permitting quick installation of production lines. It can be picked



up with the machine, and can be used again. According to company, machines mounted on these dampers will not "walk", and the isolating medium of cork and rubber will not pack down or deteriorate due to action of oil or chemicals. A core of cork plate is permanently bonded between two layers of Neoprene, grooved to increase deflection of the cushion over a wide range of loadings, and to form a non-skid surface. Installation is quick—just place machine on damper, insert fastening-leveling bolt, level-up, tighten lock nuts, and equipment is ready to work. Bulletin VPS-L gives more details. The Korfund Co., Inc.

57—INCINERATOR is smokeless and odorless

Smokeless and odorless operation claimed for this new incinerator is attributed to its high-temperature secondary combustion chamber. Controlled air is drawn in by venturi action to attain accelerated combustion which produces high temperatures, burns combustible gases, and eliminates odors. Design also allows fly ash to settle in the chamber. Bowser, Inc.

Model 606

NEW KIND OF POWER SWEEPER

Engineered to outlast—powered to outperform all others

"Filter-Vac Dust Control"—NO DUST BAG TO EMPTY! Fan deposits dust in main hopper automatically. (Pat. Pending)

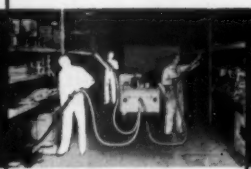
Reach-Easy Controls: No loss of sweeping time—all levers can be operated by the driver while he is seated.

Forget old ideas about power sweepers! The new Wayne is designed with engineering principles never before used in a power sweeper except for heavy duty street sweepers also built by Wayne. This new Wayne really sweeps over 100,000 square feet per hour. And it sweeps better!

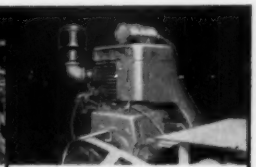
New exclusive Wayne features include: More functional design, larger hopper capacity, welded all-steel body, safety shielding of moving parts, automotive type steering, and Power-Flex lift action—features that will prove their plus value instantly on *demonstration in your plant!* 4 sizes for every sweeping need.

THERE'S A SIZE SWEEPER FOR EVERY SWEEPING JOB. LP GAS POWERED ENGINES AVAILABLE FOR ALL MODELS

Power Dumping, hydraulically operated while driver is seated.



Vacuum Attachment available for cleaning shelves, bins, equipment.



Extra Power. Model 606 has about twice the horsepower of any other sweeper.

WAYNE

Write for literature or the job demonstration

WAYNE MANUFACTURING CO.
1225 E. Lexington St. • Pomona, Calif.
☐ Please send me literature regarding new Wayne Power Sweepers.
☐ Please arrange for demonstration.

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

World's Largest Producer of Power Sweepers for Cities and Industry

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INDUSTRIAL FILMS

Power Pumps

INSTALLATION and maintenance of power pumps is visually demonstrated in a new 23-minute, sound slide film.

The film was designed to provide helpful information on power pumps to engineers and operating men engaged in oil and gas recovery, hydraulic press, and other operations.

The first part of the film is devoted to installation and gives information on foundation, suction conditions, piping support, cleaning, alignment, lubrication and testing.

The second part, on maintenance, includes instructive information on initial and replacement packing, packing adjustment, common types of pump valves, and tips on trouble shooting common pump problems.

The film will also be made available for lectures, meetings and societies where additional know-how is desirable. It may be obtained by writing to Worthington Corporation, Advertising and Sales Promotion Department at Harrison, New Jersey, requesting Film No. G-2198.

Locating Flaws

"FLAW Location with Dye Penetrants" is a film available for showing to industrial concerns, technical groups and other interested organizations. The film, which is intended primarily for training purposes, visually demonstrates every aspect of dye penetrant inspections from laboratory theory to production-line techniques filmed during mass production dye penetrant inspections.

The laboratory sequence describes the theory behind dye penetrants in detail and outlines the proper methods of assuring complete inspection accuracy. A laboratory inspection is performed on glass micro-slides which have been fastened together to simulate a defect. In this sequence, the viewer is able to see exactly what action takes place when flaws are located in metal parts with dye penetrants.

Arrangements for viewing the film or additional information may be secured by writing to Turco Products, Inc., 6135 South Central Avenue, Los Angeles 1, California.

People and Product

BELIEVING that the people behind the product are one of its biggest assets, Rome Cable Corporation has produced a 21-minute-long film entitled "Cable Makers." While the film has much to say about cable making, such technical aspects are interwoven with personalities of the people who make up the company.

This film is a companion to one made two years previously which told the story of the company's manufacturing facilities and the product. The second film is "Cable . . . Pathway of Power," and runs for 42 minutes. Both 16mm sound and color films are available on free loan from the Advertising Dept., Rome Cable Corporation, Rome, New York.

On Bonded Structures

APPLICATIONS of latest developments in bonded sandwich structures to new XP6M-1 multi-jet seaplane are featured in "Marbond," a new 16mm color-sound film which the Martin Company has made available on a loan basis, and without cost, for industrial groups or other interested persons.

The film, which replaces an earlier one, "Matador Adhesive Bonding," runs 28 minutes and contains extensive technical animation and live sequences detailing procedures for bonding contoured and primary aircraft components. Film also shows latest techniques for repairing battle-damaged panels. Inquiries should be addressed to: The Glenn L. Martin Company, Presentations Section, Mail 376, Baltimore 3, Maryland.

With an increase in business, the Interior Steel Equipment Co. has augmented their paint baking facilities. In doing this they have achieved economies in handling of work while maintaining and even enhancing the quality of their products.

They installed a Sly Convectioneered Oven, 45′ long, 9′ 6″ wide, 6′ 9″ high with semi "A" type sheet metal hoods at the exit and entrance ends to form an efficient heat seal. Beneath the oven is a self-contained 2,500,000 BTU per hour direct gas-fired heating unit.

As aids in achieving excellent finishes on the products are: (1) efficient air distribution over the work (2) temperature uniformity in the baking zone (3) correct exhaust conditions to maintain proper oven atmosphere, and (4) a low overall temperature gradient between supply and recirculation temperatures.

This installation is typical of the careful engineering that goes with all Sly Industrial Ovens. *May we discuss your requirements with you?*

Designers and Manufacturers of: Dust Control Systems, Blast Cleaning Equipment, Tumbling Mills, Industrial Ovens.

THE W. W. SLY MANUFACTURING CO.
SINCE 1870
4600 TRAIN AVENUE • CLEVELAND 1, OHIO
OFFICES IN PRINCIPAL CITIES

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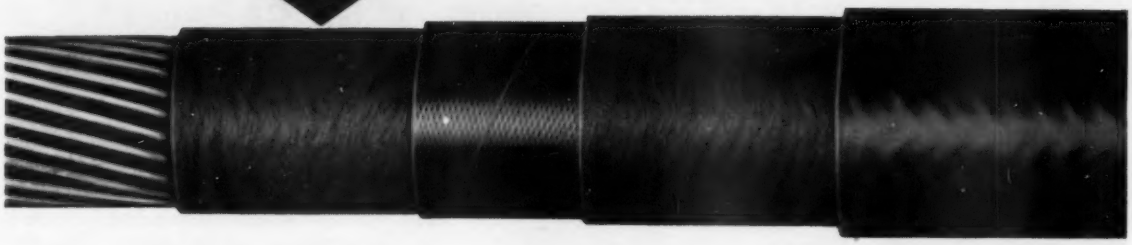
Look beneath the braid

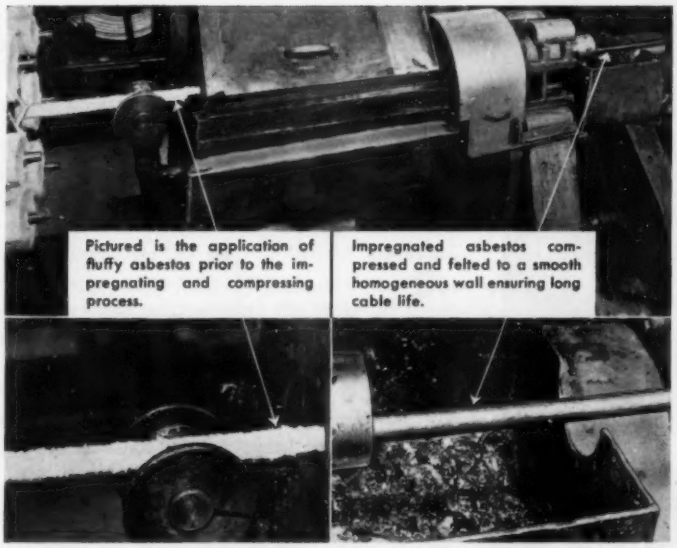
. . . that's where quality begins



these service proved felted asbestos walls insure uninterrupted operation with

ROCKBESTOS A. V. C.®

(N.E.C. Type AVA)



Pictured is the application of fluffy asbestos prior to the impregnating and compressing process.

Impregnated asbestos compressed and felted to a smooth homogeneous wall ensuring long cable life.

There's a reason why Rockbestos A.V.C. (N.E.C. Type AVA) gives such outstanding service in industry. It is the uniform, dense, felted asbestos walls which have been thoroughly impregnated with selected compounds and firmly compressed without laps, seams or joints to make them resistant to heat and moisture. Felted asbestos walls seal the varnished cambric tapes away from heat and moisture . . . keep dielectric strength high . . . add strength and protection against damage from flexing.

Because of felted asbestos wall construction you benefit with trouble-free, uninterrupted service under conditions such as high ambient temperature, overloads, exposure to heat, oil, grease, corrosive fumes and exposure to moisture.

Complete construction and test specifications of Rockbestos A.V.C. (N.E.C. Type AVA) are in the new booklet: "Specification RSS-88."

Write for your free copy.

STOCKED COAST TO COAST

Standard Rockbestos A.V.C. construction (N.E.C. types AVA, AVB, etc.) are available for immediate shipment. Call or write nearest branch office.

ROCKBESTOS PRODUCTS CORP.

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OAKLAND, CALIFORNIA

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HOFFMAN'S ENGINEERED SYSTEMS designed to do the tough jobs in industry

HOFFMAN BLOWERS PROVIDE HIGH CAPACITY, LOW COST, CONTINUOUS AIR SUPPLY

" (1) No possible contamination of air by oil.

" (2) Low noise level.

" (3) No close tolerances required for centrifugal blower and therefore a longer life.

" (4) The outlet volume and the associated motor load can be varied readily by throttling.

These four factors, in an engineer's memorandum, explain the selection of Hoffman 50-HP Multi-Stage Blowers for air agitation of the plating baths in a major automotive plating department.

The blower section of the plating department — all engineered and installed by Nankervis Company, is shown in the accompanying picture.

Only part of the Hoffman Multi-Stage story was needed to sell this installation. For the Hoffman design uses a single dynamically balanced multiple effect impeller assembly. No close clearances are needed . . . no valves, vanes, gears, rollers, pistons, or other impacting parts. There is no vibration, no pulsation, no internal lubrication, practically no wear. These blowers run continuously for years on end. Their power consumption is directly proportional to the actual volume of air moved—under pressure up to 9 lbs. psi., or under vacuum up to 12 inches Hg.

When you have air problems, involving *any* volume—at moderate vacuum or pressure, be sure to check the Hoffman Multi-Stage Blower-Exhauster. Our engineers will be glad to work with you.

U.S. HOFFMAN MACHINERY CORP.

AIR APPLIANCE DIVISION

DEPT. PE, 105 FOURTH AVENUE, NEW YORK 3, N. Y.

INDUSTRIAL FILTRATION DIVISION

Machine Tool Coolant Clarifiers—Flotation, Mechanical, and Magnetic.
Lubricating and Insulating Oil Conditioners, Filters, and Vaporizers
Solvent Recovery Systems—Vacuum Stills and Filters

AIR APPLIANCE DIVISION

Multistage Centrifugal Blowers and Exhausters
Pneumatic Conveying Equipment
Industrial Vacuum Cleaning—Portable and Stationary Systems
Continuous Metal Strip Driers
"Smoothflow" Fittings and Tubing

ORDNANCE EQUIPMENT DIVISION

Special Pneumatic Conveying Systems
High Efficiency Centrifugal Separators
Stationary and Portable Vacuum Cleaning Equipment
Process Equipment
Pneumatic Systems for Radioactive Materials

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NEW BOOKS

for the plant Engineer

Automation

SPECIAL AUTOMATION HANDBOOK. Size 11 by 8⅞ in.; 135 pp; paper bound (spiral). Published by American Management Association, 330 West 42nd St., New York 36, N. Y. Price $10.00. Limited supply.

AUTOMATION was the keyword at an American Management Conference in New York in October of 1955. Comments by most of the speakers are included in this publication in addition to other information. The subject is covered quite extensively.

This book contains material on such items as automation at Stromberg-Carlson — organization and research, review of automatic technology, the challenge of automation, impact on company organization, push-button plants and feedback system engineering.

Production Power

HYDRAULIC AND PNEUMATIC Power for Production. Size 9¼ by 6¼ in.; 407 pp including index; illustrated; cloth bound. Published by the Industrial Press, 93 Worth St., New York 13, N. Y. Price $8.50.

AUTHOR PRESENTS various applications of hydraulic and pneumatic power to production machinery. Attention is given to the choice of equipment, circuits, and fluids. Seals and packings are covered extensively with the help of clear illustrations.

Hydraulic accumulators, hydraulic valves and their functions, hydraulic cylinders, hydraulic safety controls, air regulators, power-operated holding devices, pneumatic safety circuits, and remote control pneumatic systems are some of the main topics of discussion in this book.

This is a comprehensive publication covering many details of hydraulic and pneumatic power. It should prove useful not only to the designer but also to the plant engineer who is concerned with the operation and maintenance of hydraulic and pneumatic systems.

Furnace Technology

INDUSTRIAL FURNACES by W. Trinks. Volume 11 third edition; size 9¼ by 6⅛ in.; 358 pp including index; illustrated; cloth bound. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. Price $10.00.

MUCH NEW MATERIAL has been added in this of this guide book. It contains information based on developments since 1941. The opening portion covering fuels and electric energy now has among other additions a table of properties of LP gases, up-to-date cost data on fuels and gives attention to the relation of grindability, fineness and cost of powdered coal.

In chapter two, pertaining to combustion devices and heating elements, there are numerous new topics. Among these are the following: combination gas and oil burners, gas and powdered coal burners, glass as a resistor, and new burner for luminous flames.

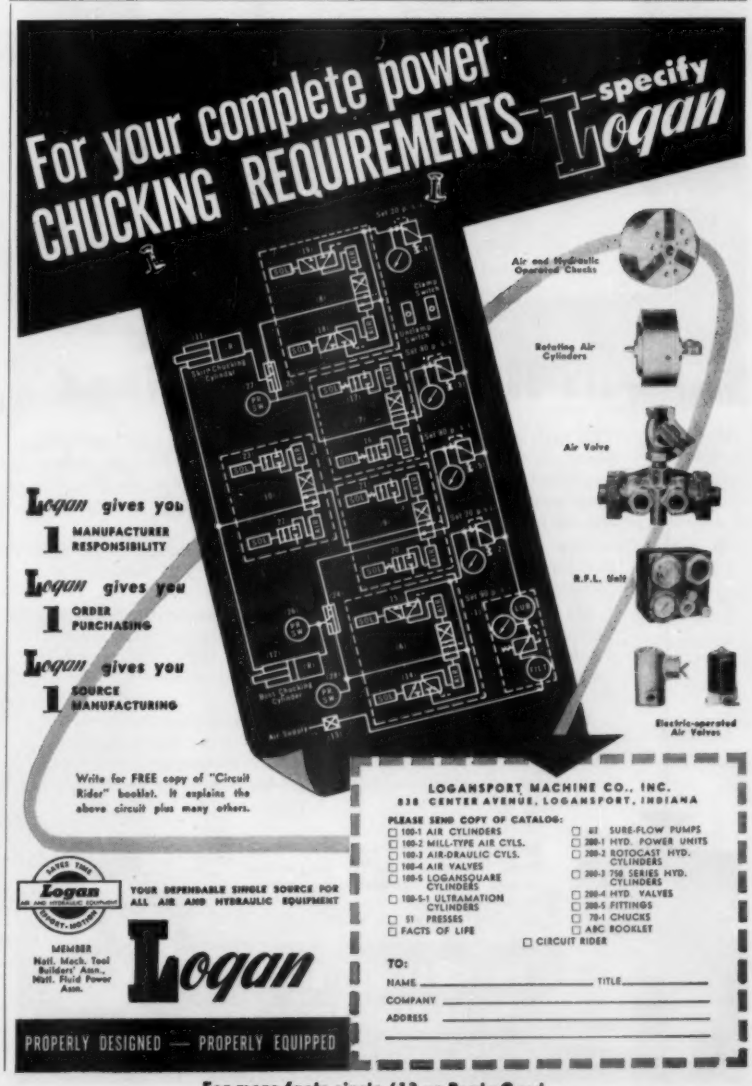
The succeeding chapter on furnace temperature control, now covers in addition to other new items, temperature control in high speed heating, and new applications methods for control in high speed heating, and new application methods for control instruments. A number of additions are also found in the next three chapters pertaining to furnace atmosphere, labor saving appliances, and comparison of fuels and furnace types.

Chapter seven is the final section in the book and it is entirely new. It deals with safety measures and is devoted to pilot flames, spark plugs, and fume disposal among other items.

On Electricity

PRINCIPLES AND PRACTICE of Electric Engineering. Size 9¼ by 6⅜ in.; 598 pp; illustrated; cloth bound. Published by McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, N. Y.; Price $7.50

MUCH HAS BEEN written about electricity since it was first harnessed for use. It is an interesting subject with many facets and one that is being broadened by new developments. For those in the plant engineering function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Air and Hydraulic Operated Chucks
Rotating Air Cylinders
Air Valve
R.P.L. Unit
Electric-operated Air Valves
Logan gives you 1 MANUFACTURER RESPONSIBILITY
Logan gives you 1 ORDER PURCHASING
Logan gives you 1 SOURCE MANUFACTURING
Write for FREE copy of "Circuit Rider" booklet. It explains the above circuit plus many others.
Logan
YOUR DEPENDABLE SINGLE SOURCE FOR ALL AIR AND HYDRAULIC EQUIPMENT
MEMBER Natl. Mach. Tool Builders' Assn., Natl. Fluid Power Assn.
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☐ CIRCUIT RIDER
TO:
NAME _____ TITLE _____
COMPANY _____
ADDRESS _____

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whose responsibilities involve electrical work it is well to have a good basic grounding on the subject. On the other hand, engineers who feel that they know electrical fundamentals quite well can perhaps use this book for "brush up" purposes.

Although use of mathematical expressions in this publication is not excessive, it would be well for the prospective reader to have a knowledge of mathematics that includes Calculus. The book begins with an elementary coverage of matter and electricity. It works its way through chapters dealing with magnetism, electromotive force, resistance, electric terms, rheostats, solenoids to d-c machinery.

Power Progress

PROCEEDINGS OF THE AMERICAN POWER CONFERENCE. Size 9¼ by 6⅜ in.; 722 pp; illustrated; cloth bound. Published by the Illinois Institute of Technology, Technology Center, Chicago 16, Illinois. Price $6.00.

THIS IS A ROUND-UP of material that was presented at a conference in Chicago in the spring of 1955. Discussions deal with nuclear energy, mechanical and electrical aspects.

On the atomic side of the ledger, consideration is given to dual cycle and sodium graphite powerplants in addition to the development of the nuclear power industry.

Under the mechanical classification of the conference, industrial steam and power, and steam generators are given attention. Some of the other subjects handled in this division are the following: research in fuels, cooling towers for central stations, small turbine developments, and automatic generation for utilities.

Industrial power distribution, dry type versus liquid type transformers for industry and series capacitors were some of the items covered in the electrical sessions.

In the water technology department, among the subjects discussed were the following: conversion of saline water, treatment of make-up water with a mixed bed demineralizer, and use of water for heat pump systems.

Construction

ARCHITECTURAL ENGINEERING. Size 11⅞ by 9⅛ in.; 494 pp including index; illustrated; cloth bound. Published by F. W. Dodge Corporation, 119 West 40th Street, New York 18, N. Y. Price $11.50.

NEW DEVELOPMENTS are explored in this extensive coverage of the subject of architectural engineering. The book embodies findings based on research and tested work of hundreds of experienced architects, engineers and other building specialists.

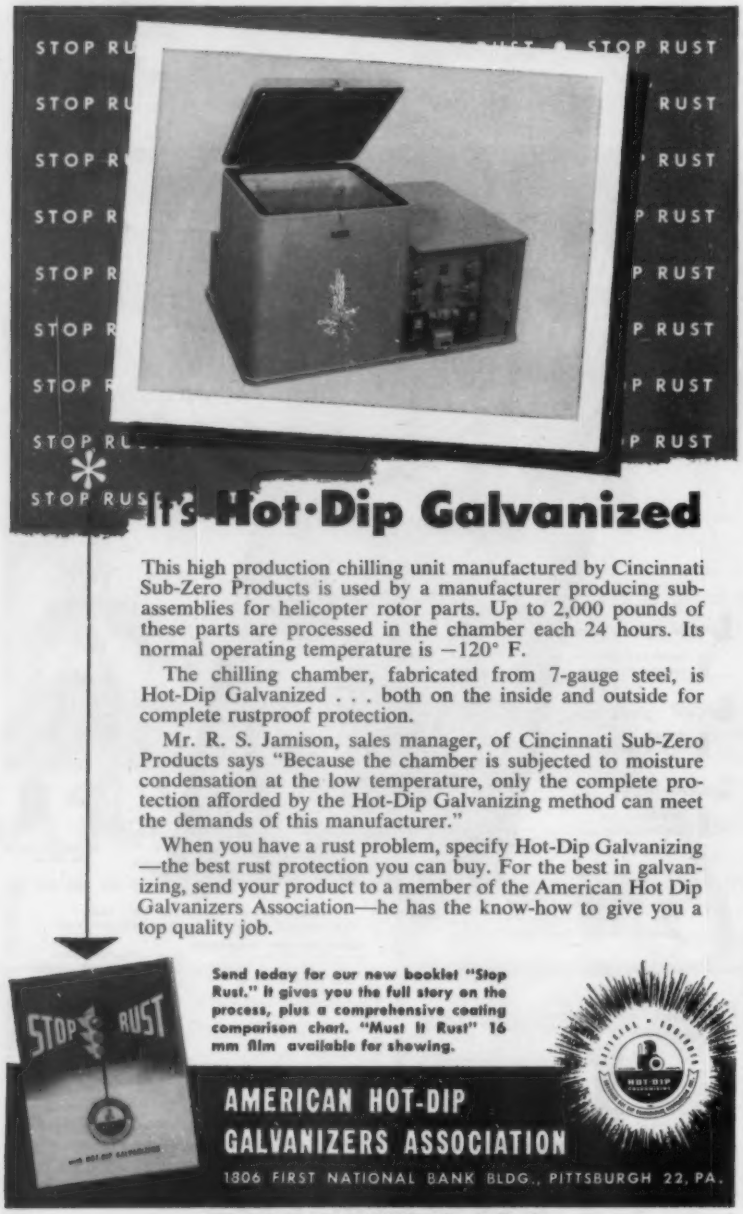
There are six main sections in the book, namely: building shell, environmental control, utilities, site planning, materials and special problems. Contents include three separate articles on the heat pump. Two of these cover tests and one reports on the use of heat pumps in two contrasting buildings.

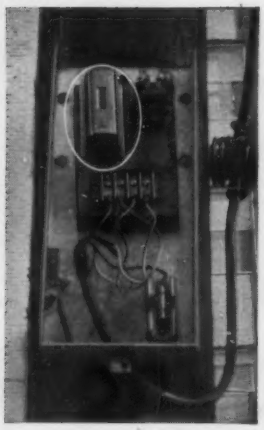
Space is also devoted to solar heating, including information on the M.I.T. solar house in one of the two articles. Some of the other items that are treated in this book are: thin shell structures, lightweight aggregates, structural plywood, and atomic blast-resistant buildings.

American Manufacturers Agents

DIRECTORY OF AMERICAN MANUFACTURERS Agents. First edition. Size 10½ by 7⅞ in.; 68 pp; paper bound. Published by T. K. Sanderson Organization, 200 E. Twenty-fifth St., Baltimore 18, Maryland. Price $17.50.

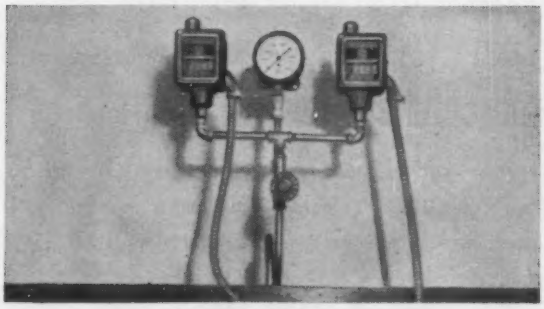
THIS PUBLICATION lists the names of manufacturers agents in forty-five states by state, city and street address. Alaska, Puerto Rico and the Hawaiian Islands are included in this listing of approximately 8,500 names.


STOP RUST
It's Hot-Dip Galvanized
This high production chilling unit manufactured by Cincinnati Sub-Zero Products is used by a manufacturer producing subassemblies for helicopter rotor parts. Up to 2,000 pounds of these parts are processed in the chamber each 24 hours. Its normal operating temperature is −120° F.
The chilling chamber, fabricated from 7-gauge steel, is Hot-Dip Galvanized . . . both on the inside and outside for complete rustproof protection.
Mr. R. S. Jamison, sales manager, of Cincinnati Sub-Zero Products says "Because the chamber is subjected to moisture condensation at the low temperature, only the complete protection afforded by the Hot-Dip Galvanizing method can meet the demands of this manufacturer."
When you have a rust problem, specify Hot-Dip Galvanizing —the best rust protection you can buy. For the best in galvanizing, send your product to a member of the American Hot Dip Galvanizers Association—he has the know-how to give you a top quality job.
STOP RUST
Send today for our new booklet "Stop Rust." It gives you the full story on the process, plus a comprehensive coating comparison chart. "Must It Rust" 16 mm film available for showing.
AMERICAN HOT-DIP GALVANIZERS ASSOCIATION
1806 FIRST NATIONAL BANK BLDG., PITTSBURGH 22, PA.
For more facts circle 614 on Reply Card



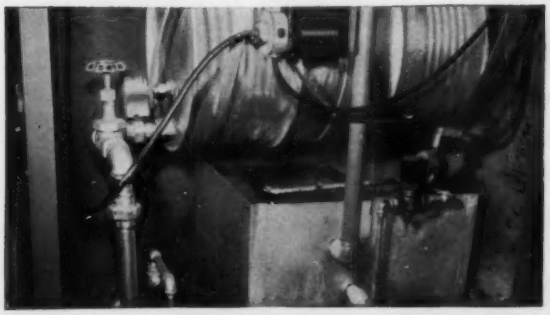
Power factor correction capacitors at Kansas City Power & Light are switched in when temperature changes . . . to compensate for air conditioning loads. Honeywell Industrial Thermostat on the utility pole does the job . . . at much lower cost than usual current control devices.

Honeywell Controller Cost $19.00*



Hosiery mill steam plant saves $1175 in fuel yearly by installing a pair of Honeywell Pressure Controllers, which make it easy and foolproof to switch from high pressures for peak production to low pressures for supplying night shift and weekend needs.

Honeywell Controller Cost $40.00*



Water consumption is reduced at Atwood Vacuum Machine Co., Rockford, Ill. A Honeywell *Aquastat* temperature controller and solenoid valve turns on a spray of tap water to reduce temperature of the coolant only when needed . . . with resultant decrease in water consumption.

Honeywell Controller Cost $12.50*

**Approx. cost. Prices subject to change without notice.*

Honeywell Industrial Controls

Reduce costs

Don't overlook these simple, low-cost controllers...they're the ideal solution to hundreds of problems

Cutting costs for materials, fuel or utilities doesn't always call for elaborate automatic control equipment. In scores of spots around your plant, you can effect substantial savings by putting simple, inexpensive Honeywell Industrial Controls on the job.

By regulating temperature, pressure, vacuum, liquid level or humidity, these versatile controls can help you avoid waste . . . reduce rejects . . . save manpower . . . prevent down-time. More than 7000 different models give you an unequalled variety from which to choose. They're simple, rugged and dependable . . . and cost surprisingly little. Readily applied to any kind of equipment, they can improve safety, protect quality of production, increase output and minimize maintenance in hundreds of different ways.

This comprehensive line of precision-made products is backed by the extensive application experience and world-wide service facilities of the largest manufacturer of controls. For a discussion of how they can be applied in your own plant, call your local Honeywell sales engineer . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

Also manufacturers of a complete line of precision measuring, recording and controlling instruments.

MINNEAPOLIS
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BROWN INSTRUMENTS

First in Controls

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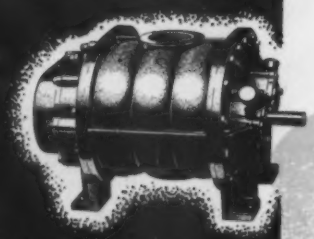
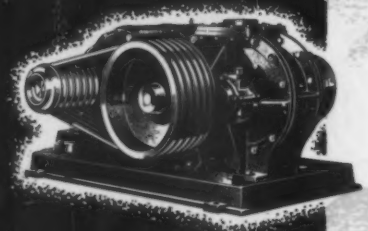
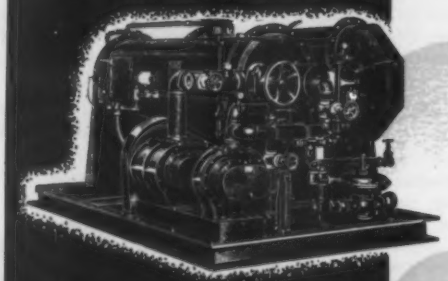


BLOWERS for such widely varying needs as lifting a damaged airplane or injecting air into water to provide oxygen for safe transportation of fish in tanks. Capacities as low as 5 cfm or up to 100,000 cfm or higher.



GAS PUMPS for inflating balloons, manufacturing electronic tubes or extracting gases from contaminated areas for test samples. They'll deliver as little as 5 cfm or as much as 50,000 cfm or more.

METERS help save money or make more profits by accurately measuring almost any kind of gas which you buy, sell or use in manufacturing processes. "Cash register accuracy" from 2,000 to a million cfh.



INERT GAS GENERATORS make hazardous operations safer from fire or explosion. They protect people, plants and products . . . and often return more than they cost in reduced insurance premiums. They'll produce inert gas for almost any use. You can have as much as 50,000 cfh or as little as 1,000 cfh in mobile or stationary equipment.

How to pull DOLLARS out of the AIR

New ways to put air (or gas) to useful, profitable work are constantly being developed by engineers and designers. These result in more effective machines and devices—frequently replacing slower or more expensive methods—often reducing the first cost of the equipment itself. These results are accomplished . . .

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In many of these applications, designers and engineers have utilized standard R-C equipment, sometimes with special adaptations. The problem may call for a small or large volume of air, moved by R-C Blowers or Exhausters. It may require vacuums, produced by R-C Vacuum Pumps. Perhaps metering or pumping of gas is needed, also met by R-C products. In any event, the solution is often . . .

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If you use or build for resale any product which might be improved by utilization of air at moderate pressures, by vacuums or by moving gas, perhaps we can help you. Even if you have only the ghost of an idea that might pull dollars out of the air, we'll gladly work with you.

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BULLETINS

(Begins on page 21)

161 **Steel Tubing**—Applications of tubular products in the process industry are discussed in 8-pp Bulletin TB-408, which lists tubing produced by company and technical literature available on stainless and alloy tubing, stainless pipe, stainless sanitary tubing, heat exchanger and condenser tubing, boiler tubing, and mechanical tubing. Table of chemical analyses, physical properties, and creep strength of 20 steels used in the process industries included. Tubular Products Div., The Babcock & Wilcox Co.

162 **On Residual Stresses**—Residual stresses in cold-finished steel bars and their effect on manufactured parts is discussed in pocket-size 32-pp Helpful Data Bulletin 16. Specific subjects covered include residual stresses in cold drawn bars, turned bars, ground bars, heat treated steel as well as discussions of fatigue, cracking, machinability, tolerances and corrosion. La Salle Steel Co.

163 **Hard Surfacing Alloys**—Physical characteristics, composition, and welding specifications for a number of hard surfacing alloys are presented in this 8-pp publication. Application recommendations are also listed. Coast Metals, Inc.

164 **Hardness Testing** — Here's a chart showing the approximate relation between hardness by various testing systems and tensile strength of carbon and alloy steels. Hardness systems covered are Brinell, Monotron, Vickers and Rockwell scales. Tubular Products Div., The Babcock & Wilcox Co.

165 **Mechanical Tubing**—Advantages to be gained by utilizing alloy steel mechanical tubing are outlined in illustrated Bulletin TB-360. Parts fabrication details are described, selection data is given, and technical literature available is listed. Tubular Products Div., The Babcock & Wilcox Co.

166 **On Test Bars**—"How to Make Good Test Bars," covers design and making of aluminum alloy and copper base test bars. Illustrations show recommended types of test bars. Melting and pouring procedures are emphasized, along with recommended temperatures and shake-out times for various alloys. The George Sall Metals Co., Inc.

CORROSION CONTROL

167 **Cathodic Protection**—This 12-pp illustrated technical brochure presents cathodic protection systems for corrosion control. Describes effect of galvanic action on metals in contact with earth or water, and explains principles utilized by these systems to halt existent corrosive action or keep new installations free of it. Savings gained by such protection are discussed and case histories given. Some typical applications are shown, and company's engineering services told. The Harco Corp.

168 **Protective Coatings** — This illustrated catalog describes various corrosion resistant coatings systems manufactured by company. Includes suggestions in regard to selection of proper coating and preparation of coating specifications. Amercoat Corp.

VIBRATION CONTROL

169 **Lattice Mountings**—Bulletin 701 describes features and applications of company's bonded rubber lattice mountings designed to solve problems of low frequency, high amplitude vibrations in heavy industrial machinery. Illustrates mounting in use on a vibrating screen, foundry shakeout and heavy motor-generator. Table lists dimension and capacity data. Lord Mfg. Co.

170 **Vibration Mounting** — Catalog SS-55 describes company's Type SB heavy-duty general-purpose steel spring vibration mountings, featuring construction details and methods of damping excursion as well as controlling sway and thrust. Load capacities and dimensions, illustrations of typical installations and engineering services are also described. T. R. Finn & Co., Inc.

Among Recently Published Literature of Merit . . .

171 **pH and Chlorine Control**—The 12th edition of company's handbook "Modern pH and Chlorine Control," 100-pp, incorporating theory and practice of colorimetric analysis, serves as a reference for quantitative determination of pH, chlorine, phosphate, nitrite, sulfate, hardness and other special tests. Slide comparators and complete test kits are illustrated and detailed methods discussed. In addition to standard pH determinations, methods are outlined for quantitative analyses of phosphate, calcium, magnesium, silica nitrate hardness in feedwater. W. A. Taylor Co.

172 **Dust Filter Facts**—Filled with facts on an advanced type of dust filter, 28-pp Bulletin 559 explains in detail the distinguishing features of reverse jet filters. Aids in solving plant dust control problems are provided. Bulletin also contains schematic operating diagrams, performance curves for various types of dust, comparison chart of reverse jet vs conventional type filter performance and air engineering data. Special pages are devoted to planning and arrangement of filters to meet specific requirements. The Day Co.

173 **Cut-Off Techniques** — Pocket-sized, this 108-pp power sawing handbook, concentrates solely on cut-off techniques. Contains a handy summary of existing methods and provides information on how to estimate cut-off costs. A chapter deals with significance of high-speed steel as a flexible saw band. Another section covers the origin and development of the saw. Also provided in this practical booklet is a section on sawing recommendations which includes a discussion on characteristics of commercial steels and suggestions for cutting these. Available to qualified plant engineers. The DoAll Co.

174 **Cinderella Fuel**—The success story of liquefied petroleum gas, whose consumption has skyrocketed in 30 years, is told in this 8-pp booklet. Provides an up-to-date, layman's description of the industry, and discusses history, characteristics, production, transportation and use of LP-gas. Gulf Oil Corp.

175 **Guide to Trackwork**—Of special interest to plant engineers concerned with industrial trackage is this 134-pp book on trackwork. Generously illustrated with photos and dimensional sketches, it contains sections devoted to various types of crossings, frogs, and switches, as well as one covering gage rods, guard rails, clamps and compromise joints. Also included is an engineering reference section containing handy mathematical, trigonometric and conversion tables and other data of value in track selection. United States Steel Corp.

176 **56 Cleaning Jobs**—The application of airless blast equipment to 56 production cleaning problems—such as those with cast, welded, forged, heat treated, and machined components—are described in 34-pp Catalog 724. Covers descaling of hot rolled steel strip, sheet, slabs, billets and structural steel, etching steel mill rolls; cleaning tubing, soil pipe, steel drums. Shot peening is also treated. Wheelabrator Corp.

LUBRICANTS, LUBRICATION

178 **Fluorocarbon Lubricants** — Chemical structure, specifications, properties, and applications of a group of new fluorocarbon oils, waxes and greases for industrial use are described in this 16-pp booklet. Among applications suggested are hydraulic pumps, pump fluids, damping fluids, heat transfer media, others. Also discussed in detail are color and clarity, viscosity, specific gravity, surface tension, flammability, vapor pressure, dielectric properties, chemical stability and other qualities. The M. W. Kellogg Co.

179 **Colloidal Dispersions**—Form 2208 is a revised folder listing 42 colloidal and semi-colloidal dispersions for operational functions, maintenance, lubrication, machine design and other industrial applications. Includes dispersions of graphite, molybdenum disulfide, mica, vermiculite, zinc oxide, and acetylene black. Carriers and diluents are given for each, along with applications and physical data. New on the list is a mica-and-water product for use as a metalworking lubricant and as a dielectric coating. Acheson Colloids Co.

180 **Centralized Lubrication**—Advantages of a centralized system of lubrication are discussed in 20-pp Bulletin 26-R. Tells how the Dualine measuring valve operates and how operation is supported by pumping units that provide a dependable source of lubricant pressure. How system helps maintain peak production is outlined. Fittings and accessories are also described. The Farval Corp.

181 **Oil Maintenance Equipment**—Bulletin 172 offers pointers on diesel and gas engine lubricating and fuel oil maintenance. Includes general recommendations for lubricating oil filters, data on filter materials, and various filters. Oil Purifier Div., The Hilliard Corp.

METALWORKING AND MACHINE SHOP EQUIPMENT

182 **Precision Equipment**—Tool post grinders, hand grinders, automatic drilling equipment, drill grinders and accessories are among the precision tools described in 40-pp Catalog 55-FL. Contains technical and application illustrations, in addition to several charts for calculating proper accessories for various types of grinding. Dumore Precision Tools.

183 **Buffing and Polishing Compounds**—Characteristics and uses of over 100 buffing and polishing compounds are described and illustrated in 24-pp Bulletin Co-103. Contains a full page chart giving cutting, coloring and double duty compounds to be used with twelve metals, plastics and hard rubber. Specific compounds are classified and described, with recommended usage, under headings of tripoli, cut and color compounds, steel and stainless steel buffing compounds, emery paste and cake, crocus, polishing lubricants, greaseless compounds. Hanson-Van Winkle-Munning Co.

To order these bulletins circle item numbers on the handy Reader Service Cards provided on the facing page.

184 **Abrasive Belt Grinding**—How abrasive-belt grinding increases production is discussed in 32-pp booklet Form 500-X, consisting of 46 illustrated case histories. Application studies are grouped according to each of five types of abrasive belt machining—platen, contact wheel, formed wheel, centerless, and flexible belt, and covers a wide range of materials—ferrous and non-ferrous metals, glass, wood, plastics. The Engelberg Huller Co., Inc.

185 **Cutting Speed Data**—This wall chart shows proper cutting speeds with various surface speeds for aluminum stock in automatic screw machines. Covers surface speeds from 50 to 1000 fpm for stock diameters ranging from ⅛ in. through 5-in. Also illustrated are proper tool angles to be used with aluminum in automatic screw machines. Kaiser Aluminum & Chemical Corp.

186 **Vapor Collectors**—Technical and practical information on Mistkop industrial vapor collectors is provided in 6-pp Bulletin 622-3. Reduced shop cleaning costs, reduced fire hazards, portability, control of machining mists, coolant recovery, and other advantages of the units are stressed. Some installations with grinders, screw machines and others are pictured and described briefly. Aget Mfg. Co.

187 **Clamp Guide**—Descriptions and engineering details on company's line of clamps are contained in 34-pp Catalog 19. Among types covered are handscrews, wood bar clamps and fixtures, band clamps, hangers, bar clamps, hinged clamps, piling clamps, and other equipment such as clamp fixtures, jig and fixture assemblies, press screws, veneer press frames, mitre clamps, others. Drawings, photos, and specifications included. Adjustable Clamp Co.

188 **High Production Presses**—Catalog 27C, 28-pp, describes high-speed automatic presses, discussing problems inherent in operating a

BULLETINS

(Begins on page 21)

press at speeds of up to 800 strokes per minute and how company has designed its line to overcome them. The complete line of presses including special features and attachments is illustrated and described, and dimensions are listed. Special sections are devoted to feed mechanisms, special purpose presses, and typical examples of work handled. E. W. Bliss Co.

189 **Straight Side Presses**—The complete capacity-range of company's double-action straight side presses, with latest design features and improvements, is shown in 28-pp illustrated bulletin Form D/2-5M855. Specifications, in easy-to-read chart form, include: capacity in tons, number of connections, bed size, effective draw, stroke, horsepower, shut-height, slide adjustment and bed opening. Graphs illustrate standard motion and slow down cycles. Danly Machine Specialties, Inc.

190 **Open Back Presses**—Bulletin 56, 28 pp, presents company's new Series E single point open back inclinable presses with front-to-back crankshaft design. All features are described. Included also are die space dimension drawings and specifications for this 75- to 200-ton line, available in both standard and automatic models. Niagara Machine & Tool Works.

CHEMICALS

192 **Chemical Products**—Properties of four ethers described as ideal commercial solvents and reaction media of high purity, plus chemical inertness and high solubility, are analyzed in this 24-pp chemical products bulletin, Form 1 5520. Includes physical and chemical properties, applications, toxicity, other data. Temperature-pressure relationships and infra-red absorption spectra given. Ansul Chemical Co.

193 **Synthetic Organic Chemicals**—Physical properties of synthetic organic chemicals are described in 24-pp Bulletin F-6136-1, featuring latest data on more than 350 organic chemicals. Products are arranged by related groups with condensed data on applications. Physical properties are given in tabular form. An alphabetical index is included. Carbide and Carbon Chemicals Co., Div. Union Carbide and Carbon Corp.

194 **Metals, Chemicals** — Six-pp Bulletin C197R gives characteristics and uses of a line of chemicals and other products derived from tin, antimony and zirconium. Includes inorganic and organic tin chemicals, organotin stabilizers, stannous soaps, antimony chemicals, zirconium products and various metals and alloys. Applications are listed for end uses in chemical industries, immersion tinning and electroplating, ceramics, textiles, and paints. Metal & Thermit Corp.

HEATING AND COOLING

195 **Hot Water Heating**—Manual 2685, 28-pp, contains a complete discussion of high temperature high pressure hot water heating systems, including design, installation and maintenance data. Appropriate drawings, charts, graphs and tables are used to amplify the text. C. A. Dunham Co.

196 **Glass Heat Panels** — Catalog GC-101, 8-pp, describes glass electric radiant heat panels, including information on both low voltage and line voltage thermostat controls. Includes installation photos, construction detail diagrams and installation instructions. A specification sheet, SS955, gives data on all units and shows six models. Berko Electric Mfg. Corp.

197 **Silent Heater**—Bulletin H-10 5 stresses noiseless and vibration-free operation of company's HusHeater. Describes applications in various industries, operation details, and includes installation and ordering data. Sims Pump Valve Co., Inc.

198 **Heat-Transfer Equipment** — Twelve-pp Bulletin 31 provides dimensions, data and capacities for easy selection of the more commonly used types of heat-transfer equipment. Stresses standardized production units which have been engineered to meet a wide range of applications in the industrial, chemical and process industries. Buxton Mfg. Co.

199 **Heat Exchange Equipment** — Physical and dimensional data charts for quick selection of heat exchange equipment are contained in Bulletin C-3008. Points out design advantage of serrated, helically-wrapped fins. Drayer-Hanson, Inc.

200 **Fluid Coolers**—Bulletin S-395, 8-pp, describes dry type fluid coolers, units developed especially for economical liquid or gas cooling. Contains information on construction, performance and maintenance, as well as data on component parts. Illustrations and descriptions of actual applications, including gas compressor intercooling, jacket water and lube oil cooling, are also contained in bulletin. The Trane Co.

WASTE HANDLING

201 **Thickeners, Clarifiers, Agitators** — Bulletin 31-E, 16-pp, describes thickeners, clarifiers and agitators for chemical, metallurgical and processing operations in which separation of solids from a liquid is required. Discusses applications and shows construction details for Auto-Raise thickeners, circular and rectangular type clarifiers, agitators, and related equipment. A formula is provided for determining tank diameters. Hardinge Co., Inc.

202 **Clarifiers and Thickeners** — Bulletin W-800B-S-6000B, 16-pp, answers questions on design requirements of clarifiers and thickeners for a wide range of capacities and solids removal loads. Illustrated with photos, dimensional drawings and tables, bulletin explains why circular sedimentation basins, sludge scrapers and central inlet wells are features of clarifiers and thickeners. Infilco Inc.

OTHER EQUIPMENT

203 **Coupling Data**—Bulletin 240 describes a quick-connect, quick-disconnect H coupling, its uses and construction, with particular ref-

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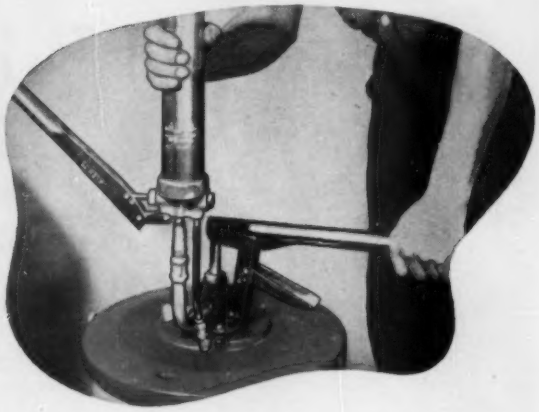

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BULLETINS

(Begins on page 21)

erence to U-packer which gives positive seal without compression set because of rubber distortion. A fully detailed cutaway of coupling is included and dimensions and ordering information given. Snap-Tite, Inc.

204 **Rubber Rolls** — This 60-pp handbook, illustrated with photos, drawings, graphs, and tables of data, contains information on every phase of roll manufacture, characteristic, application, operation, and maintenance. Explains what rubber is; how rubber rolls are made; density or hardness of rubber; balancing of rolls; the care and feeding of rolls. How rolls are built up, bound with nylon tape, vulcanized, then ground to finished shape and size is illustrated, along with applications in paper, textile, plastic, other plants. A summary of rubber rolls troubles and suggestions for treatment given. Rodney Hunt Machine Co.

205 **Instrument Tubing Supports**—Twelve-pp Catalog 255 describes and illustrates company's complete system for supporting instrument tubing of all types. Also included is the Pin-Type coupler, with which all major units of the system are equipped. Specification data is included. Instrof, Inc.

206 **Insulation Case Studies**—This booklet contains a set of five insulation case study reports applicable to the dairy food industry, showing how some low temperature space insulations problems were solved. Text and photos cover insulation thicknesses, installation procedures and results. Companies described include ice cream plants, dairy product and milk plants. Pittsburgh Corning Corp.

207 **Piston Packing** — Sixteen-pp Bulletin 5503 presents engineering data on Darcova Pumcups for packing pistons of air cylinders, hydraulic cylinders and reciprocating pumps. Included are operating diagrams and a list of typical installations, as well as helpful data on Pumcup compositions, textures and types made available for specified pressure, temperature and corrosive conditions. Proper compositions are identified for many fluids, including various gases, acids, and alkalis. Darling Valve & Mfg. Co.

208 **For Problem Wood Floors**—Edition 4 in this organization's Modern Sanitation Methods series provides simple and accepted procedures for the renovation of old, damaged and unsightly wood floors. Both sanding and sealing operations are covered, and suggestions on the sanding of new floors are included. National Sanitary Supply Ass'n.

209 **Storage Equipment** — Catalog 100-E, 72-pp, illustrates and describes company's complete line of steel cabinets, folding chairs, chests and safes, stools, tool boxes, work benches, tool stands, shelving, tool storage, lockers, coat racks, filing cabinets, revolving bins, others. Includes dimensions and other specifications. Photos illustrate typical installations. Lyon Metal Products, Inc.

210 **Heat Dissipation, Generation**—Bulletin 90030, 8-pp, discusses the subject of heat generation and natural dissipation in hydraulic circuits. Features information on heat transfer area, oil circulation rate, auxiliary pumps, power pumps and pipes and valves, complete with charted test results that should be of assistance in the engineering, installation and operation of fluid power. The Oilgear Co.

211 **Granite Surface Plates**—This well-illustrated 68-pp technical manual described the manufacturer of Microflat black granite surface plates and precision inspection accessories. Tells how granite surface plates are lapped down to overall accuracy and inspected. A section of the book is devoted to geological sources and quarrying. Collins Microflat Co.

212 **Plate Structures** — The fabrication of special plate structures from research and engineering to the various fabrication processes to erection and the completed structures is pictorially described in 24-pp Bulletin G-19. Chicago Bridge & Iron Co.

213 **Coil Testing Methods** — Bulletin 202, 22-pp, describes standard methods of testing and rating forced-circulation air-cooling and air-heating coils, to obtain performance for published data and for general application. Test methods for steam and hot water heating coils and chilled water and volatile refrigerant cooling coils are included. The Heating and Cooling Coil Manufacturers' Ass'n.

214 **Closed Circuit System**—The operation of Turbo-Dryers for continuous drying, cooling or subliming materials which are fragile, obnoxious, heat sensitive, oxidizable, or wet with solvents that are hazardous or must be recovered is presented in Bulletin 5507. Cutaway views and installation photos are included. Wyssmont Co., Inc.

215 **Packaged Boilers** — Bulletin A-1041, 8-pp, describes features of a line of self-contained, automatic packaged boilers, in 12- to 125-hp units. Operating characteristics of gas, oil, and gas-oil burners are discussed along with recommendations for application. Eclipse Fuel Engineering Co.

216 **Plastic Deflashing**—High speed deflashing of thermostat molded plastics is the subject of Bulletin PE-7. It concerns company's pellet deflashing process, in which moldings are enclosed in a cabinet-type machine and subjected to showers of soft-grit pellets hurled centrifugally upon them. Wheelabrator Corp.

DATA FILE of literature for the plant engineer's library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent data file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided for you on pages 181-182.

SPACE, PROCESS HEATING

301 **Unit Heaters** — Bulletin 7517, 48 pp, presents full information on latest design of this company's Venturafin unit heaters for steam or hot water applications. Gives features of construction, general engineering data, capacity tables. Fully illustrated with photos of horizontal and vertical models, dimensional drawings and piping diagrams, booklet includes tips on the use and selection of unit heaters. American Blower Corp.

302 **Plumbing, Heating Supplies**—Edition H is the current edition of this company's 126-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and generously illustrated; gives sizes, intended uses. J. A. Sexauer Mfg. Co., Inc.

303 **Unit Heaters** — Catalog 155, 32 pp, presents unit heaters for steam and hot water in vertical and horizontal delivery and power-throw types. Covers design features and provides performance and capacity data. Also provides information on unit heater selection, sound ratings, locating unit heaters, motor wiring and control. Piping and installation suggestions are included as well as typical unit heater specifications. Modine Mfg. Co.

304 **Gas-Fired Heaters**—Form PBI-54 describes and pictures company's Panelbloc heaters that generate infra-red rays that "heat like the sun." Discusses construction and operation of the heaters, and stresses such advantages as no air blasts, downward radiations, low maintenance. Gives specifications for the heaters which operate on any commercial type of gas fuel. Thermobloc Div., Prat-Daniel Corp.

305 **Electric Heaters**—Bulletin E-1, 8 pp, describes electric unit heaters and heater sections for general industrial heating as well as for specialized use in heating corners of factories, warehouses. Illustrates overhead downward discharge heaters with revolving and stationary discharge outlets, and a heater with horizontal discharge. L. J. Wing Mfg. Co.

306 **Electric Heat, 101 Ways**—Principal industrial heating applications and methods are described in "101 Ways to Apply Electric Heat," a 32-pp booklet. Illustrated case histories show how metal-sheathed electric heating units are being used. Physical aspects of installation are detailed along with a discussion of the problem, solution and advantages obtained. To illustrate liquid heating, diagrams and photos show best applications for the elements and heaters. Similar treatment is accorded problems of heating air and gases; melting soft metals and viscous materials; and heating machinery and equipment parts. A section is devoted to far-infrared heating. Edwin L. Wiegand Co.

307 **Hot Water Heating Systems**—Catalog GK-954, 24 pp, features a complete line of equipment for forced hot water heating systems and chilled water cooling systems. Nine pages are devoted to information on a complete line of circulating pumps for dozens of applications. All-bronze pumps for circulating service water and silent operating centrifugal pumps for boosting water pressures are a few of the new applications. Valves, fittings, air vents, air tanks and water heaters are also described in detail. Bell & Gossett Co.

308 **Hot Water for Industry**—An excellent engineering data booklet, "Hot Water for Industrial Plants," is a compilation of literature covering use of water heaters for process needs, cafeterias, lavatories, wash fountains, laboratories. Discusses hot water requirements for these applications; describes and illustrates heaters, recovery systems, booster units applicable; provides installation suggestions and operating instructions. Available to qualified plant engineers, please state your title. A. O. Smith Corp.

309 **Industrial Ovens** — Engineering, manufacturing and installation of processing ovens are described in Bulletin D-53-20, 16 pp. Covers oven types, application to industry source of heat, selection of heater, control of heat, distribution of heat. Photos show typical oven installations, and a complete modern finishing process is presented. Newcomb-Detroit Co.

310 **Industrial Ovens** — Thirteen types of company's Conventioneered ovens, which apply principles of forced convection heating to various industrial processes, are illustrated and described in 12-pp Bulletin 200. These ovens serve foundries, metal finishers, plastics producers. The W. W. Sly Mfg. Co.

PUMPS, COMPRESSORS

311 **For Hazardous Liquids**—Catalog Section D, 12 pp, presents company's line of Underwriter rotary pumps for hazardous liquids. Both mechanical seal and deep stuffing box models are shown and dimensions and specifications provided. Various mounting arrangements and drives available for these UL approved pumps are also cataloged, and application suggestions are given. Also in this booklet are performance graphs. Viking Pump Co.

312 **On Vertical Pumps**—This 16-pp bulletin describes and illustrates application of vertical industrial service pumps for liquid transfer from short settings in both industrial and process services. Points out advantages and describes three basic designs. Stresses versatility of the pumps due to design flexibility. Also gives general recommendations for obtaining optimum performance, and includes photos of typical installations. Peerless Pump Div., Food Machinery and Chemical Corp.

313 **Condensation Pumps**—Eight-pp Bulletin 1403 describes company's line of condensation pumps for use in low and medium pressure-heating systems and steam-process equipment. Photos, drawings and other technical data on capacities and dimensions pertaining to construction, application and installation are included. C. A. Dunham Co.

314 **Data on Pumps**—This 12-pp condensed catalog covers turbine-type and centrifugal pumps for a wide range of industrial uses. Gives construction specifications, capacities, application information as well as reference to

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DATA FILE

(Begins on page 186)

specific literature on each type. Fully illustrated. Also includes data on mixed flow pumps, sump pumps. Aurora Pump Co.

315 Sump Pump Selector — Bulletin 54-3-1420, 20 pp, provides a selection table allowing a plant engineer to choose any of the 4000 models of the BJ Sumpmaster pumps, which range from 10 to 2600 GPM with heads from 20 to 300 ft. Includes complete dimensions and outline drawings, simple coding system for ordering. Byron Jackson Co.

316 Rotary Pumps—This bulletin gives information and volumetric displacement specifications for heavy duty industrial pumps for tough applications, including handling paints, acids, hot varnish, paper pulp, most abrasive slurries, solvents, plastics. Bump Pump Co.

317 Steam Pump—Bulletin 230 describes a horizontal duplex steam pump with piston valve steam chest. Explains advantages of this construction, including high recovery of fuel cost when exhaust steam is utilized. Provides sectional and exterior views of the pump, also specifications, capacities and dimensions. Warren Steam Pump Co., Inc.

318 Gas-Engine Driven Compressors—A new two-cycle turbocharged compressor is described in 24-pp Bulletin 134. Stresses economy of installation and operation afforded by this gas-engine driven unit, lists other advantages. Explains how turbocharging saves on fuel and cooling. Design and construction features of this new model are discussed and illustrated in detail. Clark Bros. Co.

319 Compressors—Bulletin A72, 36 pp, gives construction, operation information on company's Class WN-114 heavy-duty air compressors. Illustrates seven models of compressor as a single unit for displacement capacities from 1186 to 1948 cfm, twin units furnishing up to 3896 cfm. Joy Mfg. Co.

320 Portable Compressors—Twelve-pp Catalog GG-9A pictures 40 models of company's portable type compressors. A quick reference chart shows capacities, engine types, and mountings available. Illustrates such features as: replaceable cylinder sleeves, interchangeable valve parts, aircraft type compressor cylinders, heavy duty industrial type engines, and magneto ignition on all gasoline models. Le Roi Div., Westinghouse Air Brake Co.

321 Compressor Data—Feather valve compressors from 75 to 350 hp are described in 32-pp Bulletin L-676-B1A. Advantages on installation, operation and maintenance costs are outlined for types YC and DYC compressors. Information and illustrations are offered on component parts including frame, running gear parts, intercooler, crosshead, motor and main bearings and various cut-away views are included. Variable capacity control information is listed along with data on governors. Diagram illustrates correct selection and coordination of auxiliary equipment in typical installation. Worthington Corp.

322 Vertical Compressors — Double-acting, motor driven vertical compressors are described as to distinctive features, regulation available, and construction details in 16-pp illustrated Bulletin 765-5. The improved cylinder design of these compressors and valve assemblies are discussed in detail. Booklet also describes air intake filters, air receivers, and aftercoolers available; and pictures some installations of the compressors. Chicago Pneumatic Tool Co.

FANS, BLOWERS

323 Industrial Fans—Propellair Bulletin 650, 12 pp, contains dimensions, application, and performance data on Tubeaxial and Stack-booster fans. Gives information on cooling and drying problems, system and open surface tank ventilation. Robbins & Myers, Inc.

324 Induced Draft Fans—Eight-pp Bulletin DB-32-53 provides engineering information on manufacturer's Bifurcator fans for providing controlled draft for boilers and furnaces. Gives construction details, sizes. Illustrated with photos, diagrams of suggested methods for installation. DeBothezat Fans Div., American Machine and Metals, Inc.

325 Industrial Fan Catalog—Of interest to plant engineers requiring quick, accurate selection of industrial fans for specified capacities. 28-pp Bulletin EX-531 contains selection tables from which correct fan for required capacity can be determined. Complete descriptive information, detailed capacity tables and dimensional data are included. Introduces a new fan offering improved efficiency. Bayley Blower Co.

326 Vaneaxial Blowers—Direct-drive vaneaxial blowers, three types of belt-drive blowers and a portable blower for exhausting fumes from tanks are described in 16-pp Bulletin A-110. Includes dimension drawings, also air delivery tables. Hartzell Propeller Fan Co.

DUST CONTROL AND AIR CONDITIONING

328 Improved Dust Filters—Sixteen-pp Bulletin 528-R gives information on continuous-automatic dust filters available housed or unhoused for use on pressure or vacuum. Explains principle of cleaning the filter cloth with high pressure reverse jet air, and tells where these filters are being used. Provides comparative test data on these and other type filters; discusses industrial dust control service offered and diagrams some installations. Self-adjusting blow rings furnished with these filters are described in detail. The Day Co.

329 Dust Control, Blast Cleaning—Bulletin 1210, 24 pp, fully illustrated, describes manufacturer's line of blast cleaning and dust control equipment, accessories. It is indexed according to equipment, type and purpose. Lists three methods of application. Pangborn Corp.

330 Dust Control—"Engineered Efficiency in Dust Collection and Recovery," 36 pp, dis-

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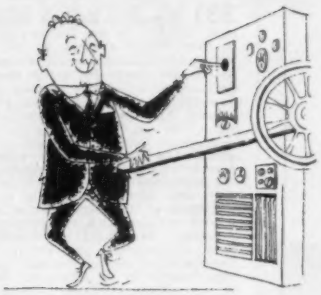

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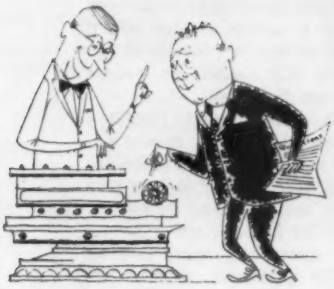

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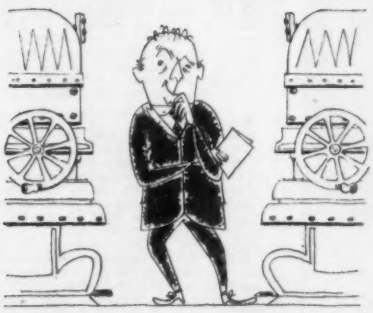

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3 NEW NORGREN AIR LINE FILTERS

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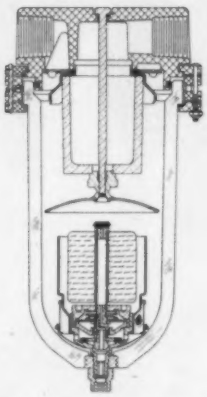
Automatic-drain filters for use with ¾" and 1" air lines are now being manufactured by Norgren in addition to their present models for use with ¼", ⅜" and ½" air lines. Three filter elements are available —74, 64, and 25 microns.

Norgren Automatic-Drain Air Line Filters filter oil, corrosive moisture, abrasive pipe scale, rust and other solids from compressed air. A float controlled, pilot operated drain mechanism, operating under constant or fluctuating line pressures with or without air flow, automatically drains collected liquids. For trouble-free operation and reduced wear, the solids are prevented from entering the drain mechanism.



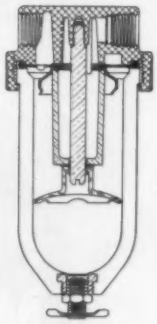
Models 11,200-6 and 11,200-8
¾", 1" Pipe Sizes

New Metal Bowl Filter

for higher temperatures and pressures

A new model replaceable metal bowl air line filter has been added to the Norgren line. The metal bowl allows the filter to be used at temperatures from —40° to 300° F and at pressures ranging up to 250 psi.

These filters are designed to create a strong centrifugal force that "wrings" a high percentage of moisture and oil from the air. A baffle traps liquids and solids in the Quiet Zone in the bottom of the bowl and prevents them from re-entering the air line. Three filter elements are available — 74, 64, and 25 microns.



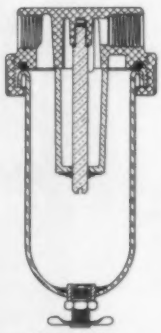
Series 12,200N
¼", ⅜" Pipe Sizes

New Replaceable Bowl Filter

a better low cost filter

Norgren is now manufacturing a new, low cost filter for applications where the removal of solids from the air is of primary importance. The replaceable bowl can easily be removed for cleaning or it can quickly be replaced if accidently damaged in use.

The filter part of the unit, a reinforced 200 mesh Monel wire screen, or sintered metal filters of 64 and 25 microns, is easily removed for cleaning without removing the entire unit from the air line. There are no moving parts to wear out and the filter functions with a minimum of pressure drop.



Series 30AD
¼", ⅜" Pipe Sizes

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For complete information about Norgren Air Line Filters, phone your nearby Norgren Representative listed in your telephone directory . . . or **WRITE FOR NEW NO. 700 CATALOG.**

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DATA FILE

(Begins on page 186)

cusses industrial dust recovery from standpoint of nuisance abatement, waste avoidance, hazard elimination. Shows effect of variation in particle size, distribution and specific gravity of dust on efficiency of the dust collecting system. Buell Engineering Co., Inc.

331 **Manual of Exhaust Hood Design**—Bulletin 270-E1, 24 pp, features engineering data on dust control systems for the metal working industries. Illustrates and discusses the design of exhaust hoods for many operations in this field. Also, 61 photos of dust control installations show various methods of hooding dust source. American Air Filter Co., Inc.

332 **On Dust Collection** — Specifications and descriptive details about company's Hydro-Filter are contained in 12-pp Bulletin 55. Tells how unit uses filtering principle to trap dust by impingement on glass spheres; entrapment on bubble surfaces and containment within water droplets. Separating efficiencies, application data, construction and design, as well as a description of models, capacity range available and description of laboratory facilities are included. National Dust Collector Corp.

333 **Flexible Hose**—A set of five new bulletins (Nos. 40 through 44) are of interest to plant engineers concerned with the design, installation or purchase of flexible hose for dust and fume control, air conditioning and materials handling. They provide general information, data on installation, application suggestions, technical data and prices on hose, duct and accessories. The Flexaust Co.

334 **Dust Collection** — Aerodyne dust collectors in chemical processing and other industries are discussed in 8-pp Bulletin 171. Explains theory and design of collector system, includes drawings of the various types covered. The Green Fuel Economizer Co., Inc.

335 **Tubing for Many Jobs** — Flexible tubing for ventilation, fume and dust removal as well as materials handling is described in 8-pp Catalog C2-4. Gives detailed information on company's Spiratube A and Spiratube R, two types of lightweight tubing made from continuous helical coils of spring wire wound with fabric. Gives uses. Flexible Tubing Corp.

336 **Dust Control Systems**—Valuable engineering data on methods of dust control as well as descriptions of company's line of dust collectors are contained in illustrated Bulletin 636-2. Specifications on all models are included. A special section tells how to design your own system. Aget Mfg. Co.

337 **How Conditioning Units Can Help**—The advantages of self-contained units in cooling, dehumidifying, cleaning are cited in 40-pp Catalog 1307. Explains installation, operation. Provides data on direct expansion and cold water cooling and on hot water and steam heating. Clarage Fan Co.

338 **Air Conditioning Filters**—Bulletin 600, 8 pp, describes company's Staynew ventilation and air conditioning filters. Specifications, engineering, performance and installation data covering dry type panel filters for the removal of air-borne impurities given. Dollinger Corp.

BOILERS, GENERATORS

339 **Packaged Boilers** — This 16-pp illustrated catalog describes manufacturer's new Type VP Package boiler. Following a section of background information is an outline of principal design features of these boilers, which are shop assembled and provide steam capacities from 4000 to 30,000 lb per hour. Space requirements are shown in a table along with specifications. Combustion Engineering, Inc.

340 **Package Boilers**—This 12-pp booklet on package steam generators, describes the formulas behind all package steam generators, and illustrates how installation of a package steam generator can raise steam capacity in an existing boiler room without extensive structural changes. Shows plant operators how to make survey of their own steam requirements. Cyclotherm Div., National-U. S. Radiator Corp.

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341 **For Lower Steam Costs**—"Have You Checked Your Steam Costs Lately?" is a 16-pp, non-technical picture and caption presentation; it serves to focus attention on high-cost features of antiquated boiler equipment. The first part of the booklet emphasizes typical boiler plant problems. The latter part illustrates packaged automatic boiler installations in industrial plants, others. Orr & Sembower, Inc.

342 **Standard Generators** — Bulletin B-55-4 describes company's SC economy series of standard steam generators designed to reduce steam costs for industrial plants. Pre-engineered, standardized steam generators offered in nine sizes, with capacities of from 50,000 to 150,000 lb per hour are described, and schematic and cutaway drawings of the units and design features are included. Foster Wheeler Corp.

MAINTENANCE

343 **Building Maintenance** — Handbook 7 offers 64 pp of information on floor surfacing, leak stoppers, external wall sealants, roadpatching, roofing materials. Includes instruction for applying them. Flexrock Co.

344 **Better Floor Care** — This illustrated folder describes products designed to aid efficient floor care. Lists combination scrubber-vac machines, conventional scrubbing-polishing machines, steel-wool pads, applicators, vacuum cleaners, mop trucks and other mopping equipment. Included are waxes, sealers and cleansers. Finnell Systems, Inc.

345 **Cleaning Problem Solutions**—Illustrated Bulletin 154, 12 pp, presents information on a wide range of cleaning methods and shows equipment available. Special emphasis is placed on the stationary vacuum cleaning system and its long-run economy in many installations. The Spencer Turbine Co.

346 **Insulation Coating** — This 32-pp illustrated handbook, Form L-17, presents the advantages of company's NoDrip insulation coating for preventing condensation drip from metal, concrete, brick, wood, plaster or composition surfaces. Lists applications and describes methods of applying. Contains tabulated data on quantity required to cover various size tanks and pipe and data on effect of different humidities. J. W. Mortell Co.

347 **Guide to Rust Prevention**—The 24-pp general catalog provides a treatise on rust prevention. Features 94 color chips of manufacturer's products and includes instructions for surface preparation and application of primers, short- and long-oil types, machinery and implement finishes, chemical and heat resistant types, sealers, oil field finishes, thinning oils and floor and masonry coatings. Rust-Oleum Corp.

349 **Hot-Dip Galvanizing**—How hot-dip galvanizing is prolonging life of industrial equipment is stressed in this 16-pp booklet. Photos showing galvanized equipment in use accompany brief text explaining how this process of covering iron and steel with a protective coating of zinc serves to prevent rust. The galvanizing procedure is explained and illustrated. Coating comparison charts show how hot-dip galvanizing compares with other types of coatings as to rust resistance, dimension limits, shock resistance, initial and maintenance costs. American Hot-Dip Galvanizers Assn., Inc.

350 **Light Scaffolds** — This series of illustrated bulletins describes company's line of aluminum alloy Up-right scaffolds and accessories. Pictures one-piece sections and multi-section models with various ranges of adjustability. Points out such features as locking hooks which provide automatic security and locking casters for safety on stairways and inclines. Up-Right Scaffolds Div., Up-Right, Inc.

CHAIN SLINGS

351 **Sling Chain Handbook**—Illustrated Data Book 100, 32-pp presents "how to do it" information on sling chains—from ordering to care, use and inspection. Contains diagrams, charts and tables on standard and special styles

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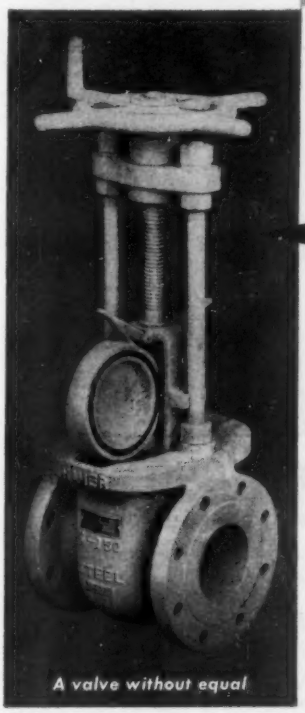

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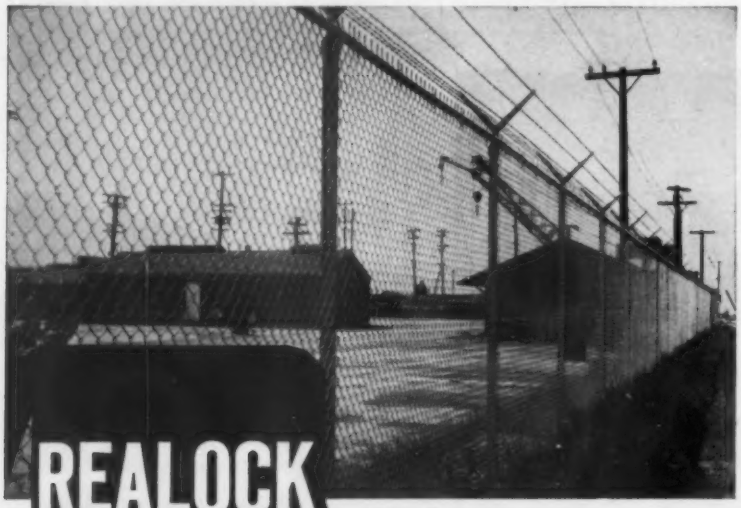
of sling chains and attachments, and their sizes, weights, and working load limits under many conditions. Columbus McKinnon Chain Corp.

352 **Sling Handbook**—The 64-pp new edition of the Tuffy Sling Handbook is replete with illustrations, charts and diagrams describing 16 factory fitted slings and nearly two dozen standard fittings available for slings, including several which are recent additions to the line. Book contains a complete rigger's manual, shop chart of ratings, an engineer's notebook and standard signals for directing operations of overhead traveling cranes and derricks and locomotives. A new development featured is the steel ferrule splice now on all Tuffy slings, which affords safety and other advantages. Union Wire Rope Corp.

CONSTRUCTION

353 **Aluminum in Architecture**—This 32-pp booklet provides information on use of aluminum, and of special interest is a discussion on architectural colors for aluminum exterior surfaces. Also describes basic types of aluminum finishes—satin, sandblast, bright, and "as fabricated." There are drawings and details of copings and gravel stops; curtain wall products, including facings, panel assemblies and wall units; industrial roofing and siding, weatherside and underside fasteners; trim and molding; sheet, plate, foil, pipe, rod and bar stocks; and structural shapes. An alloy section lists mechanical properties of applicable alloys. Aluminum Co. of America.

354 **Panel Wall Construction** — The advantages of company's M-Type Q-Panel walls are outlined in 12-pp Bulletin Q-35-55. Includes installation photos, diagrams, specifications, as well as drawings pointing out structural details. H. H. Robertson Co.



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356 **Ideas for Framing**—Some 38 installations of Dexion slotted angle framing are pictured in this brochure. Advantages and features of this easily erected, inexpensive and reusable steel framing material are discussed and three types available are shown. Uses shown include supports for overhead conveyors, storage racks, electrical mounting, work benches, pallets and many others covering a wide range of industries. Acme Steel Co.

358 **How to Glaze with Plexiglas**—Sixteen-pp Booklet PL-23 gives detailed information on glazing industrial and other buildings with flat panels of the acrylic plastic Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems. Gives properties and behavior of this sheet. Plastic Dept., Rohm & Haas Co.

359 **Heat Absorbing Glass**—This 16-pp catalog describes Coolite, a glass designed to trap and absorb much of the sun's heat and to filter out annoying glare. Discusses types and thicknesses, gives light transmission data. Pictures many industrial installations and shows how conditioned natural illumination helps reduce operating costs. Mississippi Glass Co.

360 **Translucent Structural Panels**—Bulletin 533, 12-pp, describes Resolite, a translucent structural material, corrugated or flat, molded of thermosetting polyester resins reinforced with woven glass fibers. Illustrates use of Resolite in partitioning, skylighting and decorating installations. Provides standard sheet specifications, general information on colors, weights, light transmission. Resolite Corp.

361 **Basic Roofing Information**—"What You Should Know About Your Roof" is a 40-pp clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of a good re-roofing job, also special features of company's roofing materials. Johns-Manville.

362 **Non-Slip Flooring**—Algrip, an abrasive rolled steel floor plate described as non-slip even on steep inclines, is the subject of Booklet A-5, 8 pp. Discusses safety features; gives fabricating data. Alan Wood Steel Co.

You'll save time in ordering Bulletins by using the Reader Service Cards provided on pages 181-182. Of course, we honor letterhead requests—but it takes us a bit longer to handle them.

364 **Steel Grating and Treads**—Bulletin 2486, 16-pp, describes types, sizes and load characteristics of company's line of electroforged steel and interlocked aluminum grating and treads. Points out advantages in design and construction resulting in greater safety, pictures applications, and includes specifications, photos and diagrams. Blaw-Knox Co.

365 **Metal Grating Handbook**—Sixteen-pp Form 500 is data and specification manual covering all types of grating, open steel floor armor, stair treads, vessel liners, decking and drain grates. Contains safe load tables for basic types of gratings, panel width constant charts, tables on standard widths and types of steel treads, types of anchors used for grating. Klemp Metal Grating Corp.

367 **Air Tools, Paving Breakers**—These two bulletins describe company's latest models of paving breakers and air tools for plant construction and maintenance work. Bulletin PB1 gives features and specifications on heavy-duty, medium-weight and lightweight paving breakers, as well as tools for use with them. Bulletin ST-100 describes and gives specifications for clay spaders, trench diggers and backfill tampers. Gardner-Denver Co.

VIBRATION CONTROL

369 **Improved Machine Mounts**—This brochure describes advantages of company's level-

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ing machine mounts. Tells how they enable installation and leveling of heavy machines without bolting or shims, afford increased machine mobility, reduce maintenance costs, and lessen noise. Barry Controls, Inc.

370 **How to Cut Vibration**—The use of Vibra-Mount felt in reducing machine vibration and accompanying noise is covered in this 20-pp illustrated booklet. Tells where this shock-absorbing felt is used effectively, how to select the proper mount, and how to install it. Cost information is provided, other felt products are listed. American Felt Co.

371 **Vibration Control**—Bulletin F2A shows how to write complete, correct vibration control specifications for all types of air conditioning and related equipment regardless of the operating conditions. Contains a definitive treatment of factors involved in selection of various isolation media, with particular attention to the influence of existing job conditions. A selector chart included. The Korfund Co., Inc.

INSTRUMENTS, CONTROLS

372 **Control Centers**—Advantages of control centers and their versatility are discussed in this 28-pp booklet. Illustrated with photos and full-colored drawing, booklet shows 10 typical installations of control centers and explains how this equipment can lower costs. Design and construction features are explained, and three basic NEMA types of construction described. Electrical and mechanical construction details are shown, typical specifications provided. The Clark Controller Co.

373 **Orifice Meters**—Bulletin 1050 Rev. I, 28 pp, shows how manufacturer's orifice meters are made, how they operate. Tables give capacity data, and there are descriptions of manifold arrangements and differential ranges, along with illustration of various parts. Sketches show how meters are used. Rockwell Mfg. Co.

375 **For Industrial Metering** — Practical selection and application data on meters for industrial liquids are provided in 20-pp Form 566. Explains value of metering in batch mixing, process and cost control. Illustrated charts show how to select proper meter according to type, temperature and flow rate of liquid to be metered, and include specifications for models shown. Strainers, valves and other accessories are described. Neptune Meter Co.

376 **Tank Contents Gages**—Bulletin 463 describes remote and direct reading tank contents gaging systems and also dial type hydrostatic type gages. Included are illustrations of indicators available. The Liquidometer Corp.

377 **Zone Control Equipment**—Economical operation of the heating plant through use of a zone heating control system is the subject of illustrated 12-pp Apparatus Bulletin T-385. Describes a standard and clock model, discusses electronic principle of the control system, lists specifications. Schematic drawings point out applications, show dimensions of cabinets and of bulbs and accessories. Johnson Service Co.

378 **Temperature Controls**—Eight-pp Catalog CC, on temperature controls and allied equipment for heating and refrigeration, provides information on recording, indicating, non-indicating controls; thermometers; bulb installation accessories; process timers, and gas pilots. Includes prices and references to detailed literature. The Partlow Corp.

380 **Contour Projectors**—The use of projection or optical gaging with company's contour projectors is discussed in this illustrated bulletin. Points out chief advantages and describes typical applications. Specifications and dimensional diagrams for a number of models are included. Eastman Kodak Co.

ELECTRICAL

381 **Variable Speed Motors**—Sixteen-pp Bulletin 1797, revised, outlines many reasons why variable speed motors can be used to improve production, and it includes illustrations of all

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types of company's Varidrive motors, as well as their mechanical features, remote controls; etc. U. S. Electrical Motors, Inc.

383 Motor Buying Guide — Bulletin GEC-1026, 28-pp, features company's standard a-c fractional and integral horsepower motors in most general use. Included are general- and definite-purpose, fractional horsepower motors, and fhp gear motors. A section on selection of integral horsepower motors covers horsepower requirements, enclosures, starting current limitations, speeds, motor types, and selection of fuses and circuit breakers. Descriptions and specifications cover single-phase, polyphase, totally enclosed fan cooled, and gear-type integral horsepower motors. Photos, ratings, dimensions, weights, frame numbers, and modifications included. General Electric Co.

384 Motor Starters — Booklet 1062, 16 pp, describes motor starters having short circuit protection for 2200- to 5000-v systems. Illustrates starters using company's 50,000 kva interrupting capacity type HS contactor; also starters which will safely interrupt the circuit from a bus of unlimited capacity. Indoor and outdoor installations are pictured. The Electric Controller & Mfg. Co.

385 Enclosed Switches—Catalog 83, 28-pp, describes in detail enclosed switches for industrial applications. Included are general switches designed for use on either a-c or d-c purpose switches, sealed switches, heavy-duty limit switches, hand operated switches, and maintained-contact switches, all of which are available in a variety of actuator designs, contact arrangements and electrical ratings. Photos, dimensional drawings, circuit diagrams, electrical data are included. Micro Switch, Div., Minneapolis-Honeywell Regulator Co.

386 FHP Manual Starters—Bulletin 224 is a folder giving the features and ratings of a

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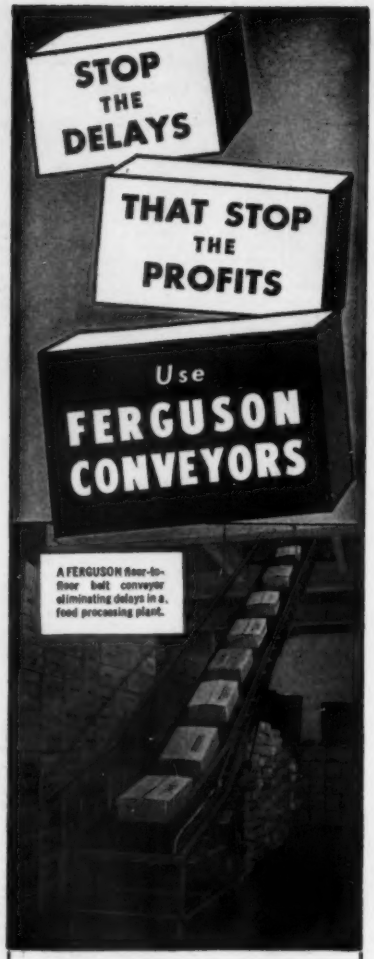

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(Begins on page 186)

line of fractional horsepower manual starters. Lists applications for them. Square D Co.

388 **What You Should Know About Circuit Breakers**—Sixteen-pp Manual 101 explains operating principles of basic circuit breaker designs and provides engineering data on factors of application. Includes simplified diagrams of three basic types. Illustrates with colored charts and diagrams, explains temperature factors, inrush current effects, tripping and reset time. Heinemann Electric Co.

390 **Power and Control Cables** — Sixty-pp Catalog 24 describes typical power and control cable designs and is intended as a guide in selecting proper wire and cable type. Describes insulations, sheaths and coverings, electrostatic shielding, and includes product data on all types listed. Rome Cable Corp.

391 **Electrical Conduit**—This 8-pp bulletin, Form 646, describes company's heavy-duty, rigid steel electrical conduit, reproducing test data sheets to show how the protected conduit stands up under corrosive attacks of salt spray, sulfuric acid, caustic soda, and exposure to excessive heat. Four-color photos illustrate the effects on this and other conduit after exposure to attacks listed above. National Electric Products Corp.

392 **Trolley Busway Systems** — Three new bulletins offer real help on electrical installations involving cranes and hoists, assembly and production lines, moving test lines and other moving electric equipment. Bulletin 35 (28-pp) covers 225-500 amp systems; Bulletin 40 (44-pp) 100 amp systems; Bulletin 45 (40-pp) 60 amp systems. Each includes special sections on installation planning and procedure, methods of mounting and equipment descriptions. Feedrail Corp.

394 **Handbook on Storage Batteries**—This 64-pp booklet of instructions and technical data is the sixth edition of this company's battery service manual. Provides a brief treatise on the theory of the lead-acid battery. Gives detailed instruction on the care and operation of batteries, on maintenance and repairs, and on standard and special parts. Booklet is of special value to plant engineers concerned with storage batteries for cycle service in industrial trucks and materials handling equipment. Gould-National Batteries, Inc.

396 **Motive Power Batteries**—This 48-pp general service manual on lead acid batteries for all types of motive power application is a practical guide to industrial cycle service, including industrial truck, air conditioning, and others. Includes photos, charts, tables, methods of repair, maintenance and theory of operation, instructions covering repairs with regular or special tools, simplified testing methods including safety practices, acid handling precautions, and charging methods. C & D Batteries, Inc.

397 **Flexible Cords** — This well-illustrated 24-pp booklet includes all new Underwriters' classifications for flexible cords manufactured by this company. Featuring data on Dynaprene and rubber jacketed cords as well as braid covered types, also gives tips on how to select proper cord. Whitney Blake Co.

398 **Wire-Wound Components**—Catalog R-200, a 36-pp guide to manufacturer's electronic components, describes subminiature resistors, precision and power resistors, IF and RF transformers and coils. Tables and charts give specifications. I-T-E Circuit Breaker Co.

LIGHTING, COMMUNICATION

399 **Fluorescent Lighting**—This 24-pp fluorescent lighting guide book is a reference digest on fluorescent products. Gives advantages of this type of lighting; summarizes various lamps and parts, including starter sockets, lampholders. Includes reference chart for lamp performance when interchanged with typical ballasts. Sylvania Electric Products Inc.

401 **Guide to Luminaires** — Pocket-size, 28-pp Bulletin B-5799-BB covers fluorescent luminaires for industrial and other use. Summarizes salient features of each type of luminaire as it discusses electrical characteristics, maintenance and mounting data,

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DATA FILE

(Begins on page 186)

details of construction, dimensions, and recommendations for application. Also contains a pictorial guide to floodlights and incandescent luminaires for industrial and other use. A 4-pp tabulation of buying data concentrates information needed for procurement. Westinghouse Electric Corp.

403 Industrial Lighting Equipment—Technical data on company's CFI-10 and CFI-25 industrial lighting equipment with porcelain enamel reflecting surfaces is featured in two new illustrated bulletins. Chief design features are pointed out and dimensional data are given. Day-Brite Lighting, Inc.

404 How to Use Sound Signals—This new 44-pp combination manual, data book and catalog is an excellent reference work on industrial sound signals. Includes a simplified explanation of fundamentals of sound; a glossary of sound and signal terminology; a quick-comparison guide for selecting equipment; suggested steps in choosing a signal installation, and hints for compiling a code signal call system. Benjamin Electric Mfg. Co.

405 Television Equipment — Twenty basic applications for "TV Eye" low-cost closed circuit television equipment are described and pictured in Form 3R2335. Folder explains equipment's functions and operation, lists specifications. Radio Corp. of America.

WATER CONDITIONING

407 Testing Equipment—Designed for use as a guide in the selection of water testing equipment, this 12-pp bulletin describes complete line of titration stands and tests for hardness, alkalinity, chloride, sulfide, etc.: cabinets and test set for similar tests; Conducto Bridge for determination of specific conductance

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nuts, screws, "frozen" parts
. . . . without breakage!

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A powerful blend of quick-acting solvents that frees "frozen" parts without breakage. Safe for all metals and alloys.

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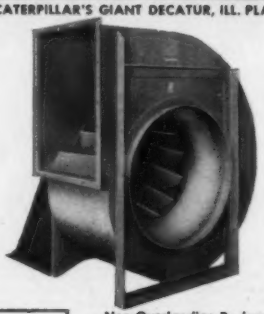
CATERPILLAR'S GIANT DECATUR, ILL. PLANT



Non-Overloading Backward Blade Centrifugal Fan for Heating, Ventilating, Air Conditioning

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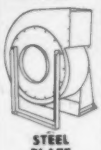

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In 1950 Caterpillar Tractor Co. bought 32 No. 6 DIDW General Blower Co. fans for their new Joliet, Ill. plant. The fans operated so successfully over a four and one half year period that Caterpillar installed 27 General blowers in their huge Decatur, Ill. plant. These fans move 1,220,000 CFM and fully meet all official ventilating requirements.

General Blower Co. manufactures a complete line of air moving equipment for heating, air conditioning, ventilating, industrial, and power plant applications.

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DATA FILE

(Begins on page 186)

of water solutions, colorimetric comparators; and the photometer. W. H. & L. D. Betz.

408 **Handbook on Demineralizing**—Comprehensive 40-pp Bulletin 5800-B compares various methods of water treatment, indicating the comparison between demineralizers and evaporators. It discusses the characteristics of the various types of available cation and anion exchange materials and offers data on operating costs of demineralizing. It tells when to use 2-bed, 3-bed, 4-bed, mixed or mono-bed demineralizers. It also indicates when decarbonators or vacuum deaerators are required. The bulletin is replete with typical flow diagrams, photos of installations. Cochrane Corp.

409 **Information on Ion Exchangers**—Here are three booklets on ion exchangers; Nalcite HCR, a styrene type cation exchanger; Nalcite SAR, a basic anion type; and Super Nalcolite, a synthetic gel type zeolite for cation exchange. Tables and graphs explain performance of these water treating resins under various operating conditions. Physical characteristics, exchange capacities, regeneration techniques given. National Aluminate Corp.

410 **For Industrial Water Softening**—Greensand, zeolite and resinous exchange water softeners are described in 8-pp Form S105. Discusses features and applications of each of these basic types and illustrates some installations. Includes capacity data and general specifications. Also describes and pictures controls for water softeners, pressure filters and deionizers. Illinois Water Treatment Co.

MATERIALS HANDLING

411 **Diesel Hydraulic Locomotive**—Eight-pp Bulletin 2006 describes company's Model SH 2225 diesel-hydraulic industrial locomotive. Included in bulletin are tables of characteristics, descriptive information on component parts, a capability table, tractive effort curve. Baldwin-Lima-Hamilton Corp.

413 **Cranes for Big Jobs**—A new 1½-yard shovel, 35-ton crane is described in this 6-pp catalog. Action pictures of the machine in quarries and gravel plants are included, also specifications. American Hoist & Derrick Co.

415 **Electric Hoists**—Twelve-pp Bulletin DH 133B describes Speedway electric hoists of 500- to 4000-lb capacities. Fully illustrates and explains design features and gives details on suspensions and conductor systems. Clearance data, specifications included. Wright Hoist Div., American Chain & Cable Co., Inc.

416 **Crane and Hoist Parts**—Bulletin G8 covers company's line of hoist grabs as well as component parts for various type cranes. Includes photos and drawings of the parts, along with descriptions and specifications. Downs Crane & Hoist Co.

418 **Floor Cranes** — 1954 models of this manufacturer's hydraulic floor cranes are described and pictured in the 8-pp bulletin. Shows cranes from 1000- to 6000-lb capacities, giving applications and special features of each. Ruger Equipment, Inc.

420 **How to Choose a Crane**—Designed to aid in the selection of overhead cranes, 8-pp Unit 97 shows how to analyze handling problems, decide on the type of crane desired and draw up specifications for crane proposals. Basic data is provided on classes of crane service, crane ratings and capacities and recommended speeds for bridge, trolley and hoist, along with standard dimensions and clearances. Gives 14 safety features. Whiting Corp.

422 **Floor Type Conveyors**—Catalog 51, 90-pp, contains engineering data on company's line of floor type conveyors, including belt conveyors, apron conveyors, bulk handling conveyors, chassis assembly conveyors, drag conveyors, flight conveyors, foundry block conveyors, log conveyors, mould conveyors, package handling conveyors, piano hinge conveyors, and others. Also covers other conveyor equipment such as conveyor chains, inclines and declines, cross sections, switches, sprocket turns, take-ups. Catalog is profusely illustrated with

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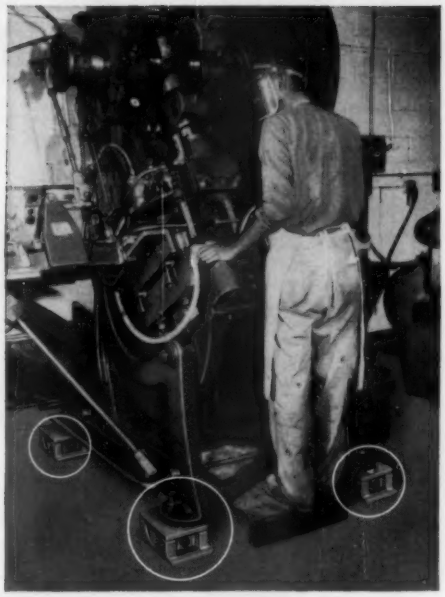
Increases Employee Efficiency



This large punch press, installed on an upper floor, had both neighbors and employees complaining about shock and noise—the rubber mounts used by the company just couldn't do the job. Korfund engineers recommended mounting the press on four Steel-Spring Vibro-Isolators. This was speedily done—since the Isolators' built-in leveling screws eliminate shims, and lagging to the floor was not necessary. The neighbors' complaints stopped immediately, and employee efficiency increased.

Of course, all our installations are not as critical as this—on some, the major requirements are eliminating foundation bolts and leveling the equipment. In cases such as these, plant engineers are enthusiastic about Korfund LEV-ELASTO Dampers—the lowest cost adjustable leveling mount on the market.

Solving vibration control and machinery mounting problems is Korfund's specialty. We have more than a half-century of experience in the field. Our experience lets us recommend "the right way the first time"—no trial-and-error basis is necessary.

All Korfund products are designed to provide equipment mobility by eliminating bolting equipment to the floor, and to provide leveling where necessary.

Reserve your copy of the booklet "The Plant Engineer's Guide", coming soon. Write for Bulletin 29.

For specific recommendations contact us or one of the 46 local Korfund offices. Look under "Korfund" in your local Telephone Directory or in Thomas' Register.

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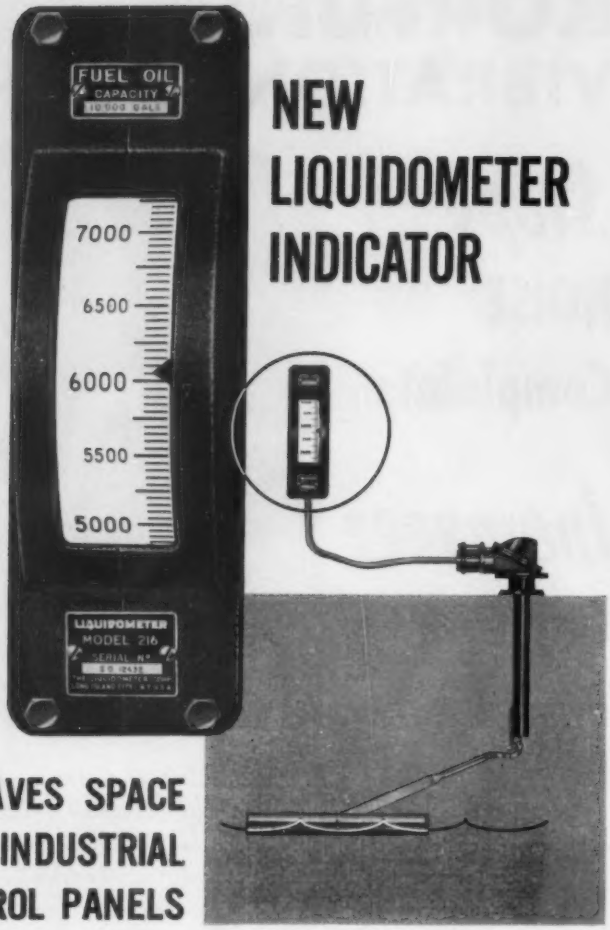

NEW LIQUIDOMETER INDICATOR

SAVES SPACE ON INDUSTRIAL CONTROL PANELS

Twenty-inch dial in 3x10¼" case permits close readings

The new Liquidometer Model 216 Indicator gives the plant engineer a reliable, automatic reading of storage tank contents. Available in either vertical or horizontal design, the compact and highly readable Model 216 Indicator makes possible multiple installations on crowded control panels.

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For further details on the new Model 216 Indicator, write Dept. D for Bulletin 532.

THE LIQUIDOMETER CORP.
SKILLMAN AVENUE AT 36th STREET
LONG ISLAND CITY 1, NEW YORK

For more facts circle 668 on Reply Card

DATA FILE

(Begins on page 186)

photos, schematic drawings, and includes full specifications. Jervis B. Webb Co.

423 **Roller Conveyors**—Catalog 60A, 20-pp, contains engineering data on medium and heavy duty roller conveyors, including specifications and capacities on rollers and bearings. Heavy duty mobile unit for straight sections of roller conveyor is illustrated, also roller curves, spur sections, sliding switches, converging sections, vertical lift and horizontal gate sections in permanent and portable types. Installation views are included. The E. W. Buschman Co.

425 **Conveyor and Elevator Belting Tips**—This 32-pp manual on installation, maintenance and care of conveyor and elevator belting, uses photos and drawings to show ways to improve belt service and lengthen belt life. Includes a discussion of belt design, covers, reinforcements and grades. Repair methods, splicing, and fastenings are also covered, and there's a table listing common conveyor belt maintenance problems. The B. F. Goodrich Co.

426 **Conveyor Trolleys**—A new line of ball bearing trolleys for overhead conveyors is covered in 20-pp Book 2536. Contains specification data for the selection of new trolleys, or of replacement trolleys for existing installations. Describes many features resulting in low operating and maintenance cost. Link-Belt Co.

427 **Metal Conveyor Belts**—This 24-pp booklet is an illustrated guide to selection of metal conveyor belts. Presents both conventional and balanced spiral weave belts; covers raised edge and flight constructions, chain edge construction, high temperature belts, wire conveyor aprons. Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp.

429 **Conveyor Belting**—Folder 54-3, contains a capsule description of construction, types of treated stitched canvas belting for all conveying and elevating applications. Describes company's general conveyor and elevator belt, oil- and acid-resisting belts to handle hot materials to 600 F. Imperial Belting Co.

430 **Fork Truck Efficiency Test**—This 8-pp article explains how to tell when fork trucks need corrective measures. Lists equipment and facilities necessary for truck testing, tells how to test traveling efficiency and hoist speed measurements, shows suggested test data forms. Mercury Mfg. Co.

432 **Oil-Hydraulic Lifts**—Catalog RE-203, 20-pp, covers the field of heavy-duty oil-hydraulic lifting devices for industrial applications. Featured in catalog are company's standard Levelator lifts, a 6000 lb single-jack model and a 12,000 lb dual-jack lift. Also featured is an electric pump mounted on an oil tank for powering oil-hydraulic devices. Illustrates lift platforms, platform accessories and safety devices, jacks, power units. Rotary Lift Co.

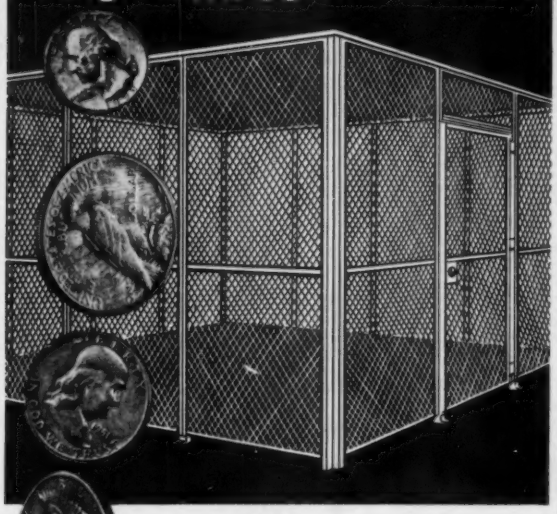
434 **Casters and Wheels**—Catalog 138 is a 191-pp product manual on company's line of casters and wheels, describing design features and listing full specifications. Photos and drawings are used profusely to illustrate data, covering furniture casters, wheels, glides, desk shoes and various accessories. Darnell Corp.

436 **Handling Baskets**—Bulletin B-54 describes company's complete line of standard and custom-engineered Eezy-Stak parts handling baskets, for machinery, washing, plating. Wire & Iron Products, Inc.

VALVES, TRAPS, PIPING AND ACCESSORIES

438 **Choosing the Right Valve**—Presenting valve selection as a matter of matching the valve's service characteristics with the service requirements of the job, this practical 20-pp booklet explains and illustrates basic design features of gate, globe and check valves. It tells in non-technical language, how each of these valve types works, and where it is best suited for use. Disc, stem connection, bonnet and bonnet-joint characteristics are also discussed and stem-operation is treated. Crane Co.

Change to WIPCO Wire Partitions



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WIPCO partitions have no rough edges to invite corrosion, snare clothing or cut hands. They're easy to paint and clean—promote better "house-keeping." When your plans call for partitions or enclosures*, specify WIPCO for lower costs and increased efficiency!

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Powerfully built—guaranteed not to warp or break, always tracks perfectly . . . Famous RIDGID thin-blade or heavy-duty cutter wheels of tool steel roll easily, cleanly through any pipe.* Every cutter factory-tested! Buy them at your Supply House.

*Special wheels available for stainless steel and cast iron.

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DATA FILE

(Begins on page 186)

439 For Quick Valve Selection—Here's a 20-pp catalog digest providing ordering and application information on gate, globe, angle and check valves in bronze, iron, cast and forged steel construction, also valve accessories and parts. Illustrated, includes pressure-temperature chart. The Ohio Injector Co.

440 Butterfly-Valves — Construction details, engineering and application data on butterfly valves are provided in three illustrated bulletins. Eight-pp Bulletin 557 covers those of standard heavy-duty construction; Bulletin 558, 8 pp, those of standard medium-duty construction; and Bulletin 559, rubber-lined butterfly valves. W. S. Rockwell Co.

442 Bronze Valves—Globe and angle bronze valves with rising stems, union bonnets and stainless steel plug type seats and discs are described in this bulletin. Discusses design advantages, gives dimensions. Walworth Co.

444 Hydraulic Control Valves—Eight new hydraulic control valves with ball detent for position locking are described in 26-pp Section 4 of this company's Catalog 200. Included are six three-position, four-way valves, and two two-position, four- and three-way valves. Dimensional data and typical circuit diagrams are provided. Logansport Machine Co., Inc.

446 Valve Charts—Now available to plant engineers are three well-organized wall charts on valve types, selection and protection. "How to know valves" covers four main types of valves from the standpoints of their appearance, inside construction, service intended, operation and use. "How to select valves" discusses five major factors involved in the choice of a valve—fluid, temperature, pressure, size, and function. "How to protect valves"—written in "do and don't" style covers 11 important points on valve installations, operation and maintenance. R-P & C Valve Div., American Chain & Cable Co.

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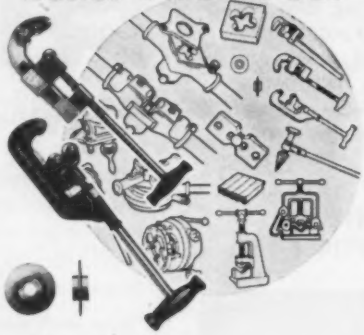

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"ARMSTRONG BROS." drop forged Pipe Cutters are built for lifetime service with 1-piece drop forged steel heat treated body and a replaceable hardened steel nut to take up the wear and thrust to handle screw. Used either as 1-wheel (with 2-rollers) or 3-wheel (for close quarters).

"ARMSTRONG BROS." Knife Blade Cutter Wheels are machined from special alloy tool steel properly heat treated. They cut rapidly and easily, hold their keen edge.

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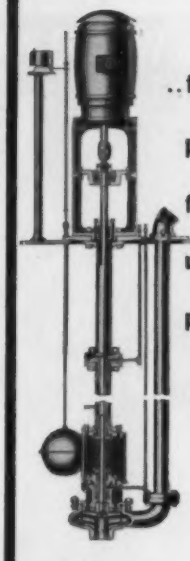

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DATA FILE

(Begins on page 186)

448 **Bronze Valves**—Bulletin 110 points out the advantages of company's "500 Brinnell" bronze globe and angle valves with stainless steel seat and disc. Design features are illustrated and dimensional data is included. Kennedy Valve Mfg. Co.

450 **Steam, Air and Gasoline Traps**—Catalog 751, 32 pp, is a trap ordering book with capacity tables, installation diagrams, and containing charts and formulas for determining proper size trap for specific applications. Covers thermostatic steam traps, expansion steam traps, weight-operated traps for steam, air, gasoline, pressure up to 1500 lb. W. H. Nicholson & Co.

451 **Steam Trap Reference Manual** — Bulletin T-1740, 24 pp, tells why and where steam traps should be used; explains desirable trap features. Advantages of company's impulse steam traps are described, their operation illustrated. How to figure trap size and how to size condensate return lines is told and capacity and pipe dimension charts and thermodynamic properties of saturated steam included. Yarnall-Waring Co.

452 **Valve Couplings**—Bulletin 551 presents engineering data on company's line of valve couplings, hose couplings and hose clamps. Includes dimensions for valve couplings, price list, and a table showing dimensions of standard hose couplings. C. B. Hunt & Son, Inc.

The two Reader Service Cards on pages 181-182 are easy to use and need no postage. Just circle the item number of catalogs wanted.

454 **Wrought Iron Pipe** — Technical information required in specifying pipe and tubing is graphically presented in this 52-pp catalog. Tables list size and dimensional data of wrought iron pipe and tubular products, and show dimensions. Data is also provided on wire and sheet metal gages, flow of water in gpm and conversion factors. Tables include size and dimensional data for various types of pipe. Supplementary tables give information on wrought iron physical characteristics and special properties. A. M. Byers Co.

455 **Welded Fittings**—Catalog 3 is a 36-pp ordering and engineering reference book on company's Weldolets for piping services. Gives data on butt-welding and socket welding Weldolets as well as on Thredolets for making threaded outlets. Typical installations are pictured; sizes, weights and prices provided. Also included are installation instructions and a technical section. Bonney Forge & Tool Works.

456 **Corrosion-Resistant Fittings**—Lower installation costs, greater flexibility and improved flow conditions are among the advantages claimed for company's line of corrosion-resistant fittings described in this 24-pp bulletin. Includes photos, diagrams, and charts listing dimensions, other specifications. Horace T. Potts Co.

457 **Expansion Joints** — Rubber expansion joints for relieving strains and stresses in piping, absorbing vibration, eliminating noise are the subject of 8-pp Form AD-137. General advantages of rubber expansion joints are presented, and spool-type, U-type and rectangular-type joints are described as to construction and intended services. Also provided is catalog sheet on all-Teflon joints and Teflon-lined rubber joints. The Garlock Packing Co.

TOOLS, WELDING, AND MACHINE SHOP EQUIPMENT

458 **Data for the Shop**—"Fluids and Facts for Metal Working" is a pocket-size booklet of about 44 pp. A section on metal working fluids covers their function and selection, prepa-

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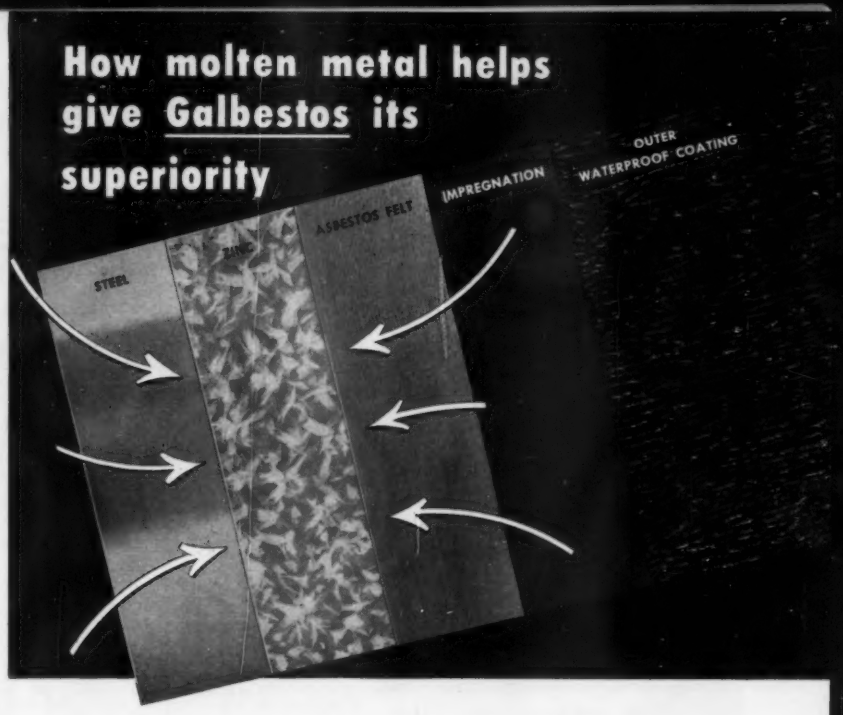

Robertson Galbestos has the greatest resistance to weather and corrosion of any protected steel roofing or siding obtainable anywhere. This position of broad superiority is made possible by a unique manufacturing process exclusive with H. H. Robertson Company.

First, the steel sheet is pickled . . . then given a coating of molten zinc. Asbestos felt is then pressed on so that as the molten metal hardens in cooling it grips the felt fibers in absolute bond. The asbestos is then impregnated with a special asphaltic compound and, finally, given a tough weatherproof coating. Galbestos can be furnished flat or in the 3 well-known corrugations: Standard, Mansard, and V-Beam. The resultant material is so durable, it may be sheared, bent, rolled, crimped and riveted in the field as easily as ordinary unprotected steel. It will withstand the greatest possible extremes in weather temperatures without deterioration, and will actually retard fire better than naked steel. For an industrial roofing or siding that requires no maintenance under the most severe corrosive conditions, specify Galbestos.

Long Service Life. Galbestos will give longer maintenance-free service under the most severe weather and man-made corrosive conditions. Even salt air cannot penetrate its tough coatings to destroy the steel core.

Not Fragile. Galbestos' strong steel core sheet guarantees against breakage—during shipment or during erection.

Resists Climatic Extremes. Galbestos is not subject to damage either by tropic or frigid temperatures. Its coatings will not run under broiling sun or crack or spall in sub-zero weather.

Goes Up Fast. The exclusive Robertson *Top-Speed* method of attaching Galbestos to structural steel speeds up erection for quicker occupancy.

Resists Flame. Leading testing laboratories have made exhaustive tests on the fire resistance of Galbestos and have published the results. Copies of these reports are available for study.

Robertson

Galbestos

a product of **H. H. Robertson Company**

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In Canada: Robertson-Irwin Ltd., Hamilton, Ontario

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NEW CONVEYOR BELT IDLER

Handles sticky, abrasive, dusty, or corrosive materials.

Has only two bearings—up out of the dirt.

A 2-bearing, cable suspension idler that resists dust, abrasion, corrosion and material buildup is proving itself superior for bulk handling in many industries.

Called the Limberoller, it has already given *10 times* the service life of replaced steel idlers in handling abrasive foundry sands, coal, petroleum coke, potash, copper ores, copper mill tailings, iron ore, wet concrete, triple super phosphate, ammonium sulphate, and sticky fertilizers.

Pressure-molded neoprene or rubber discs on a flexible steel cable conform to load and cushion the belt, help keep belt aligned, and are self-cleaning. The two bearings are up out of the dirt zone; have had no design failures.

Unaffected by most corrosives that damage steel, the new idler is ideal for chemical, sulphur and salt plants; corrosive and high ozone atmospheres. It is more abrasive-resistant than steel and flexes out of the way of abrasive materials.

The Limberoller weighs 2/3 less than a conventional steel idler; is locked by a simple cotter key into special lightweight stands for easy installation and removal. No cover sheets are needed. Two types of stands are available: one that bolts to conventional rigid sections; and a self-supporting type that forms its own easily-erected, portable sections without bolts, by using special stiffening rails.

Because of these unique features, many companies have adopted Limberollers as standard for all belt conveyor operations. Details from *Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa. Request Bulletin 24-15.*

For more facts circle 640 on Reply Card

DATA FILE

(Begins on page 186)

ration and use of soluble oils and paste compounds, and prevention of dermatitis. A section on metal working facts gives conversion tables, steel numbering systems, machinability ratings of metals, drill grinding charts, twist drill sizes and other data. Standard Oil Co. (Ind.)

459 **Portable Electric Tools** — This 1955 Standard Catalog, Form 10, 24 pp, features company's line of portable electric tools, including electric drills, bench-drill stands, hole saws, buffing and polishing kits, sanders, polishers, grinders, hammers, saw blades, vacuum cleaners, and others. Photos and full specifications included. The Black & Decker Mfg. Co.

460 **Where to Use Your Stud Driver** — Twenty-pp pocket-size Form 955 describes and pictures applications of studs, using company's Model 450 stud driver. Provides some operating hints and safety precautions and covers use of studs through steel into concrete, wood into concrete, wood into steel and steel into steel, as well as their use for attachment of pre-drilled fixtures. Remington Arms Co., Inc.

462 **Pipe Tool Ordering Guide** — Catalog 2-51, 8 pp, covers company's line of threaders, cutters, vises, dies, tongs and wrenches; gives prices. Armstrong Bros. Tool Co.

463 **On Spot Welding**—"Spot Welding from One Side—With a Portable Gun," 12-pp, describes an inert-gas-shielded tungsten-arc spot welding process. Over 30 tables, weld cross-section and application photos, drawings and graphs are included. Sections of text cover when to consider spot welding from one side, how the equipment operates, standards and test procedures, factors affecting weld. Air Reduction Sales Co., Div., Air Reduction Co., Inc.

LUBRICANTS, LUBRICATION

464 **Automatic Lubrication**—Sixteen-pp Catalog L-52 describes force feed lubricators of all types of machinery. Illustrated, gives full design and construction details on company's open and enclosed type lubricators, available in capacities from 2 to 32 units, 1 to 24 feeds per minute. Hills-McCanna Co.

465 **Colloidal Dispersions** — Forty-four colloidal and semi-colloidal dispersions for operational functions, maintenance, lubrication, and other industrial applications are listed in this revised booklet. Includes dispersions of graphite, molybdenum disulfide, mica, vermiculite, zinc oxide, and acetylene black. Carriers and diluents are given. Acheson Colloids Co.

466 **Bearing Lubrication**—Vol. XL, No. 10 of this company's Lubrication magazine provides an excellent 12-pp article on industrial bearing lubrication. Illustrated with photos and drawings, text covers such subjects as bearing design; bearing surfaces; bearing overhaul; aspects of lubrication, including factors involved in choice of turbine oils and diesel lubricants, and the effects of moisture; life expectancy of lubricants. The Texas Co.

467 **Centralized Lubrication**—Pocket-sized 24-pp, Form 34-22, called "Ask Anyone in Industry" describes in comic-book form the hazards and inefficiency inherent in conventional lubrication practice and promotes use of centralized lubrication—in the form of Alemite Accumeter measuring fittings. Shows how these are connected by tubing to a lubrication pump controlled by a timer. Alemite Div., Stewart-Warner Corp.

468 **For Better Lubrication**—Advantages of company's lubricants which are specially compounded for lubrication of reduction gear drives are outlined in this pocket-size folder. Features which assure smooth, trouble-free gear drive performance and lower maintenance costs are listed. Gulf Oil Corp.

MECHANICAL POWER TRANSMISSION

469 **Roller Chains, Sprockets**—Catalog 754, 64 pp, describes, illustrates a line of roller chain stock sprockets, including minimum bore sprockets for reboring, also finished bore and Taper-lock bushed sprockets which are ready to use. Tables show speed ratios for sprocket combinations, standard keyways and setscrews. Includes chain selection and application data, installation and lubrication recommendations, chain length calculations, dimensions and price lists for single and multiple strand roller chains. Diamond Chain Co.

470 **Sprockets and Chain** — Bulletin A-624 24 pp, is compiled to provide plant engineers with all data required for selecting and ordering roller chain and sprockets. Devotes a page to Taper-Lock sprockets for each size of chain from 40 to 100, giving sectional drawing, dimensions, number of teeth, maximum stock bore available, weights, prices and other data. Another page covers Taper Lock bushings; and full information is given on riveted and cotter-type roller chains. Dodge Mfg. Corp.

471 **High-Flow Coupling**—Bulletin 230 outlines the advantages of company's quick-connect disconnect Hi-Flow Coupling. Discusses uses and construction, includes a fully-detailed cut-away of coupling, lists dimensions and gives ordering information. Snap-Tite, Inc.

472 **Improved V-Belts**—This literature on company's Vulco rope drives explains how this rope with concave sides is designed to fill out to a precise fit in the sheave groove, to provide less wear, more pulley contact and more sure power when needed. The Gates Rubber Co.

473 **Adjustable V-Belt** — This 8-pp catalog covers company's new Veelos TD and TE V-belt designed to reduce installation and operation costs on big drives. Studs, cup-washers and T-screws of the belt are illustrated, and installation and operation characteristics explained. Booklet includes directions on how to measure, to couple and uncouple, and to install. A table shows current lengths for these belts. Manheim Mfg. & Belting Co.

474 **Improved Motor Pulleys**—The complete redesign of this company's standard line of Vari-Speed motor pulleys is described in 28-pp Bulletin V-545. Replete with illustrations, some in full color, this booklet covers construction

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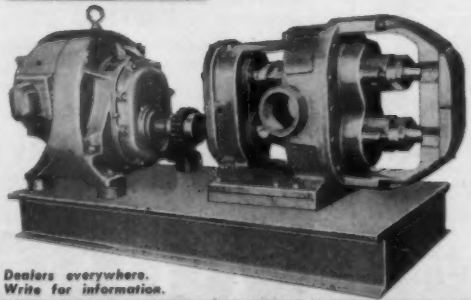

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A limited number of career openings are available to experienced graduate mechanical and industrial engineers in du Pont's centralized Engineering Department in Wilmington, Delaware. Successful applicants will provide consulting service and technical assistance to operating plants on problems in the broad field of engineered maintenance.

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Please send complete resume, including details of education and experience, to:

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Engineering Department
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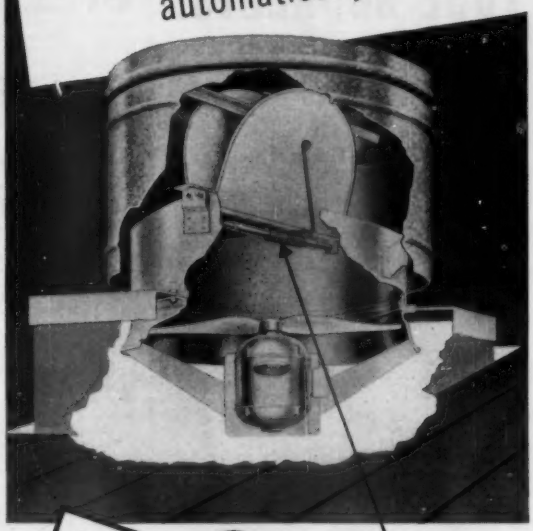

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DATA FILE

(Begins on page 186)

details, lubrication, controls available. Provides instructions on how to select proper unit, complete rating tables and dimensional diagrams. Also includes data on the Vari-Speed Jr. Reeves Pulley Co.

475 Flexible Couplings — Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings. Tells advantages of these couplings and discusses design principles. Double-flexing and floating shaft types, light duty couplings and types for special applications are described and pictured in detail. Thomas Flexible Coupling Co.

476 Fluid Couplings—Bulletin 144-D, 14-pp, presents complete installation and performance data on fluid couplings. Illustrated with diagrams and drawings, bulletin shows ease of applying company's fluid couplings on any type industrial equipment, powered by any type electric motor or internal combustion engine from ¾, to 850 hp. Describes standard models providing standard input, output combinations, and standard models in packaged units. Installation hook-ups are given, along with typical applications. Twin Disc Clutch Co.

OTHER EQUIPMENT

477 Finding Fault Grounds—This 32-pp illustrated booklet covers use of the Allen ground detector in the detection and location of electrical fault grounds. Separate chapters cover grounded vs ungrounded systems, operating instructions, explanation of misreadings encountered, complete cancellation, detection of fault grounds in lead-covered underground cable, tracing buried and/or hidden elements. Excel Electric Service Co., Inc.

478 Thermal Controls — Descriptive information and basic technical data on company's Thermoswitch controls are presented in 52-pp Catalog 400. Generously illustrated, this booklet explains basic principle of the controls and why they are sensitive only to heat. Selection and application suggestions are provided. also ordering instructions. Products listed include cartridge, hex-head, block head, flange head, all-purpose, junction box, high temperature and other types of the controls. Fenwal Inc.

479 Battery Manual—Battery selection techniques are emphasized in 20-pp Bulletin 210, a revised edition of this manufacturer's manual on storage batteries for stand-by power, emergency lighting and switchgear applications. A discussion of charging equipment and simplified battery maintenance procedures is included. Storage battery installation procedures are described and illustrated by photos. Exide Industrial Div., The Electric Storage Battery Co.

480 Neoprene Design Book—This illustrated bulletin discusses the properties of Neoprene, showing how they are utilized in products made from this chemical rubber. Covers its toughness, hardness range, air retention, performance under load, at extreme temperatures, flame and chemical resistance. Elastomers Div., E. I. du Pont de Nemours & Co.

481 Humidification for Profit—Bulletin 500, 16 pp, includes physical data and prices on electrically controlled and air operated humidifiers. Handbook section explains how relative humidity affects hygroscopic materials, static electricity, health and comfort. Photos show installaltions and several pages are devoted to selection and installation tips. Many helpful tables included. Armstrong Machine Works.

482 Storage Shelving — Rapid erection, strength and other advantages of manufacturer's storage shelving are stressed in this illustrated bulletin. Shows component parts, open types, closed types and some of the many combinations of dividers, bins, doors available. Also presents tool inserts, other shop equipment. DeLuxe Metal Furniture Co.

483 Metal Finishing Systems—Bulletin HH-100 provides a quick view of the complete metal finishing equipment offered by this company. Shows washers, bake ovens, paint spray booths, pickling machines, sludge filter and other equipment. U. S. Hoffman Machinery Corp.

484 Machines for Special Products — This 12-pp catalog lists company's machine tools and other metal fabricating, forming, treating and processing equipment which is now available for contract manufacturing. Types, quantities and operational dimensions of the facilities are included. The Jeffrey Mfg. Co.

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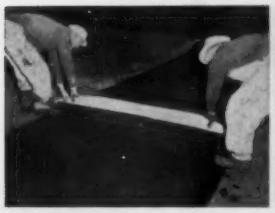
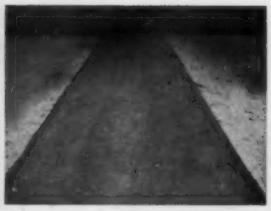
NEW FLOORS In 24 Hours





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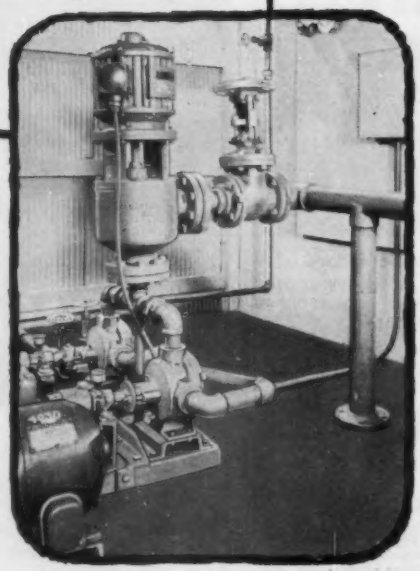

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DATA FILE

(Begins on page 186)

485 Precision in Packaging — The advantages of automatic machine packaging are outlined in this illustrated 24-pp bulletin. Describes various packaging and sealing machines, indicates kinds of packaging machinery now being produced. Illustrates various folding carton styles. Robert Gair Co., Inc.

486 Finishing Systems—Illustrated Catalog A-653, 12 pp, describes complete finishing systems for porcelain and synthetic enamel, lacquer, paint, and other finishing. Also covers a variety of other industrial equipment including ovens, dust collectors. The R. C. Mahon Co.

487 Self-Locking Nuts—This folder describes Flexloc self-locking nuts; shows how the locking action of the one-piece all-metal nut can be used either as locknut or stop nut. Applications of the nut are illustrated in small drawings. Standard Pressed Steel Co.

488 L.P. Gas Fuels—Factors essential to efficient utilization of L.P. gas fuels are discussed in this 20-pp illustrated bulletin. These include responsibility factor, know-how factor, supply factor, quality factor, application factor, construction factor, and continuing service factor. Industrial Div., Skelly Oil Co.

489 Industrial Leathers—These illustrated data sheets cover company's leather products and include belting. Also give data on leather packings for hydraulic and pneumatic equipment. J. E. Rhoads & Sons.

490 Steel Reservoirs, Standpipes — This 24-pp booklet pictures installation of reservoirs of 50,000- to 10,000,000-gal capacity, having cone, umbrella or ellipsoidal roofs and ornamental structures with special architectural features. Chicago Bridge & Iron Co.

491 Teflon Products — Three new bulletins present this company's Teflon packings, gaskets, special parts and stock. Bulletin CP552 describes Chempro lines of Teflon ring packing, Teflon impregnated asbestos packing, V-type packing, and Teflon seal cage—for use with acids and strong chemicals. Bulletin CP553 covers Teflon jacket gaskets, solid ring gaskets, expansion joints and special gaskets. Bulletin CP554 illustrates special parts. Chemical & Power Products, Inc.

492 Insect Control — Featuring manufacturer's insecticides and insect control equipment, this practical 36-pp booklet provides excellent tips on the control of industrial insects. More than 60 pests are pictured along with specific information on where they are found, identifying features, extent of damage, life stages and cycles, characteristics of existence, and recommended control measures. Ten insecticides are discussed in detail. Atomizers, mistorizers and fogging units are pictured and described as to advantages and applications. West Disinfecting Co.

493 Improved Quenching Oil—A new quenching oil with thermal stability and high boiling range, particularly suitable for quenching systems requiring a high flash-point, is described in Form A-3073. Discusses advantages of this quenching oil and includes specifications. Sun Oil Co.

494 Magnetic Selection Guide—Twelve-pp illustrated Catalog C-5000-B, describing manufacturer's entire line of magnetic separators and lifting magnets, serves as handy guide to selection. Dings Magnetic Separator Co.

495 Aftercoolers, Separators—Bulletin 711, 12-pp, describes cyclone separators and pipe line aftercoolers for compressed air systems. Prepared to aid plant engineers in taking a realistic cost accounting of their compressed air systems, it offers suggestions as to the scope of such an accounting and a check list for analyzing the efficiency of the job being done by aftercoolers now in use. Also provides a chart covering moisture content of air under pressure at various system temperatures. Illustrates and describes aftercoolers, separators and air filters. R. P. Adams Co., Inc.

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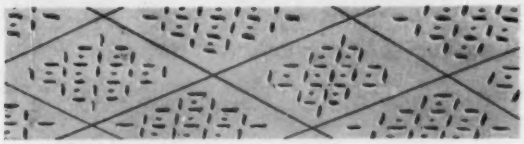

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Maintenance and Automation

(Continued from page 98)

Labor Grades Will Be Revised Upward

"Automation, as such, hasn't affected our operations as yet. We do find, however, that wherever operations are modernized, increased use is made of electronic controls. Necessarily, the calibre of our maintenance men has to be higher than heretofore. Our machine repair men too must have additional training to aid them in identifying sources of trouble.

"Our equipment for testing is becoming more extensive. We have had to acquire, in the last year, all kinds of gadgets for testing electrical apparatus—and we really have not been touched by automation as other plants know it.

"I am sure we are going to have to revise our labor grades upward due to the increased qualifications our maintenance people must possess. Certainly we will find it more and more difficult to fill in openings from the ranks. We will no doubt have to resort to hiring qualified and experienced personnel."

Name Withheld
By Request
Maint. Supvr.

Downtime to be Critical Because of High Cost

"Automation will bring about a marked change in maintenance techniques and activities. More special trained or skilled workers will be needed to keep the highly complex production machines in efficient working order.

"In foundries such as ours, a need for the electronics man will arise. More engineers and clerical help will be necessary, due to the demand for accurate records and controls in maintenance.

" 'Downtime' under automation will not be tolerated because of the terrific cost of idle, high speed production equipment. Thus increasing the need for 'Productive Maintenance'. Maintenance will no longer be considered a 'necessary evil' but as a key operation department. This will mean a higher level of prestige and income for maintenance people."

L. T. Puzin
Asst. Plant Engineer
The Chicago Hardware Foundry Company.

Preventive Maintenance Is of Utmost Importance

"During the past three or four years, we have installed some new machines which might fall into the classification of automation. This equipment has lowered our operation costs but has increased our maintenance costs. Naturally the operation costs have been reduced substantially, while our maintenance cost has increased very little.

"We find that the manufacturers of this equipment have recognized the needs for training programs in their plants for the benefit of their customers' maintenance men. We feel that sending the maintenance men to the manufacturers' plants has done much in getting them to grasp the need for knowing the operation and the need for practicing preventive maintenance. Preventive maintenance in this automation program is of utmost importance to prevent loss of production."

Harold Travis
Plant Engineer
Jacob Ruppert

Three Areas of Activity In Maintenance of Controls

"The word 'Automation' has become an all-encompassing title for the functions involved in producing a product automatically. To the control engineer it means the development and creation of the means of automatically controlling the equipment necessary for the production of a product.

"The completely automatic production plant has been proven feasible. The end results of this type of plant would be increased production of a more uniform, higher quality product, at a cheaper unit cost. The very nature of these results, desirable as they are, tends to emphasize the importance of continuous, uninterrupted operation of this type of plant. It also tends to tie all functions of the plant into one co-ordinated function, so that the failure of any one stage of the production process would tend to completely block all production in the plant.

"To the control engineer, the control phase of maintenance is of greatest concern. The maintenance of controls can be divided into three areas of activity.

"1. Ease of maintenance in the original design of controls.

"2. Fault-finding devices and operating

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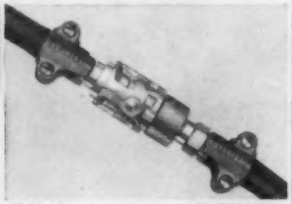

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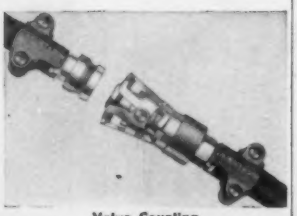

Valve Coupling Unlocked and Disconnected

Valve Coupling Locked in "Off and Exhaust" Position

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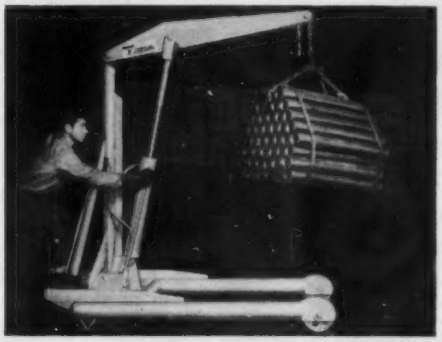

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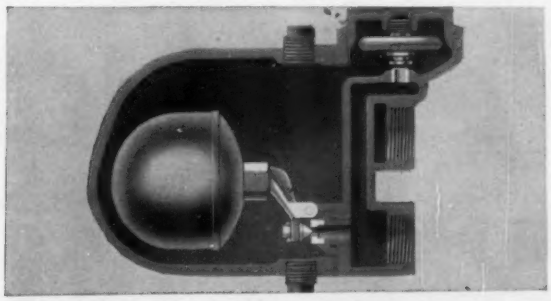

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- ✓ Continuous service . . . air motor cannot burn out from overload or prolonged use.

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and position-indicating means in the original design of controls, which will become important tools to the maintenance engineer.

"3. Education of the maintenance engineer.

"A. Company sponsored schools for keeping maintenance personnel abreast of developments in automatic controls.

"B. Complete and comprehensive information on individual machine controls supplied by machinery manufacturers.

"C. Adequate designations on all components, both on the machine and within the control enclosure, mounted so that they will not be lost when component is replaced.

"In conclusion, it is the opinion of the writer that the general acceptance of the automatic plant is dependent entirely on the ability of industry to provide adequate maintenance for equipment involved."

R. N. Johnson
Sales Manager
Electrical Controls Div.
W. F. and John Barnes Co.

Trend Will Be Toward Higher Intelligence Quotients

"As automatic controls become more widely used and more complicated, the skill and knowledge of the maintenance crew must increase or improve.

"Increased life of tools may well be expected as automation tends to lessen or guard against the human elements of error, carelessness and oversight. Maintenance will become less a matter of replacing broken machine parts and more a matter of highly skilled installation and adjustment of controls.

"The trend will be away from strong backs toward higher intelligence quotients. This will place the burden of proof with supervision, to sell the rank and file of maintenance workers on the necessity for present and future education to keep abreast of their job requirements."

Vernon A. Kahl
Moraine Products Division
General Motors Corporation

Maintenance Personnel Needs Intensive Training

"A great many industrialists feel that this is going to solve all of their production problems. A great many others feel that no good will come from it. Automation like anything else, will accomplish the things we want it to accomplish when used properly, and with good judgment. Many strenuous jobs can be lightened by automatic controls and machinery. Machinery can be speeded up and production increased by the use of automatic controls on machinery.

"Just as we would not ask a blacksmith to repair the automatic transmission in our car, neither should we expect our present maintenance personnel to maintain and repair all of the new automatic controls on machinery that come under the heading 'Automation' This can only be accomplished through intensive training of our maintenance personnel, and keeping them up to date with the latest theories and techniques of this equipment. When automatic lines are not functioning properly because of the lack of proper maintenance, just because some did not know how to make the proper adjustments, valuable production minutes are lost which in some cases, can result in thousands of dollars of lost production, poor quality work, etc.

"Automation will help us produce more at a faster pace at a lower cost, but automation is only a word. It is the man behind the machine who still counts in keeping that machine operating at peak performance It is true that automation may reduce operator labor costs by reducing the number of operators required to physically perform a given task. On the other hand, it will require more skilled maintenance personnel properly trained in the techniques of keeping the equipment going."

Paul Bobick
Plant Engineer
Continental Can Company

A Technical Progress

"Automation is a technical progress, creating greater technical demands on maintenance personnel.

"The type of equipment we have had to set up and make operate so far requires about 25 per cent of maintenance to be of engineering ability in addition to the regular maintenance force, and as we get deeper into automation maintenance personnel will increase in numbers."

C. A. Wedge
Plant Engineer
Mine Safety Appliances Co.

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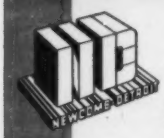

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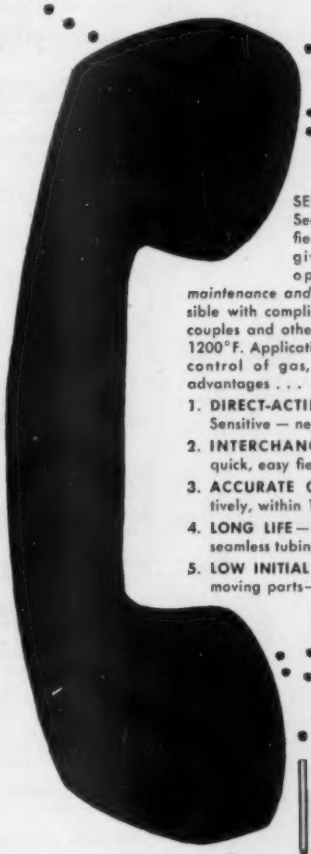

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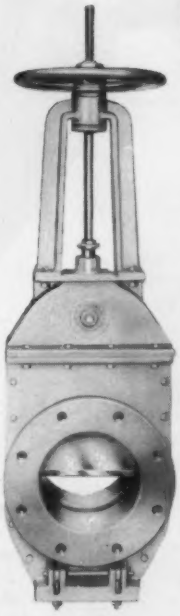

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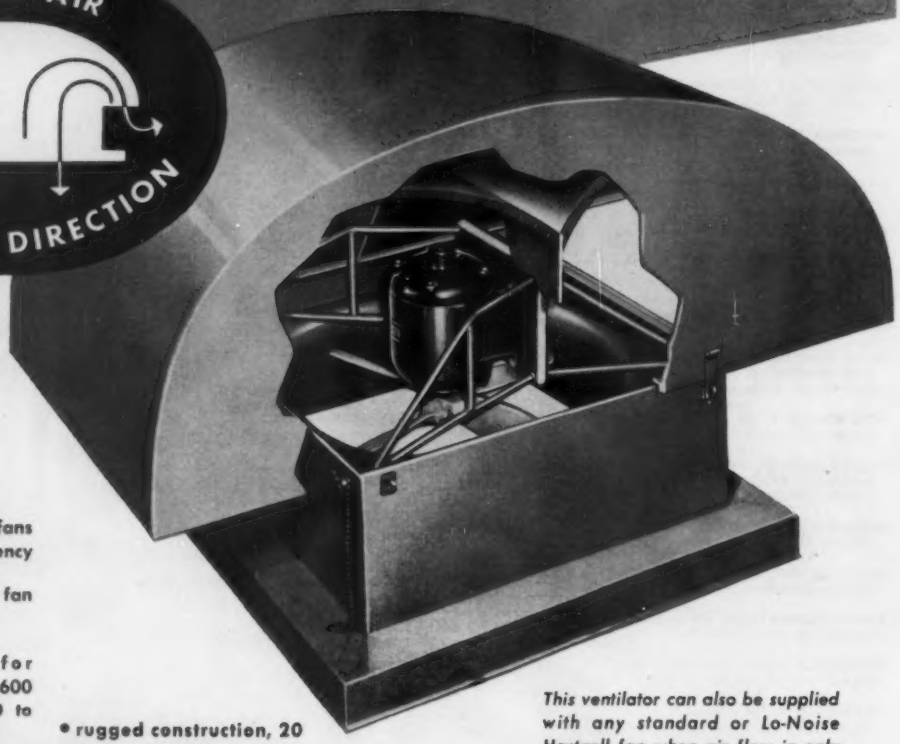

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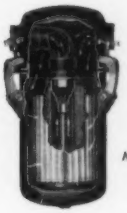
Model CPH Pipe Line Filter Bulletin 200



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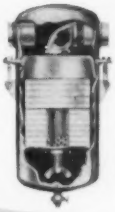

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all types of FILTERS for every INDUSTRIAL NEED

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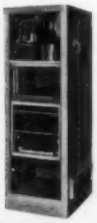

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USES—ALLTEMP is recommended for insulating high temperature surfaces such as oil stills, boiler walls, breechings, furnaces and other equipment where surfaces to be insulated reach 1600° F.

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ALLTEMP RECOMMENDED THICKNESS

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	200	400	600	800	1000	1200
	Nominal Thickness, Inches					
1½ & Under	1	1	1½	2	2½	3
2	1	1½	2	2½	2½	3
2½	1	1½	2	2½	3	3½
3	1	1½	2	3	3	3½
3½	1	1½	2	3	3½	3½
4	1	1½	2½	3	3½	4
4½	1½	2	2½	3	3½	4
5	1½	2	2½	3	3½	4
6	1½	2	2½	3½	4	4½
7	1½	2	2½	3½	4	4½
8	1½	2	3	3½	4	4½
9	1½	2	3	3½	4½	5
10	1½	2½	3	4	4½	5
11	1½	2½	3	4	4½	5
12	1½	2½	3	4	4½	5
14 & Over	1½	2½	3½	4	4½	5½

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Lockland, Cincinnati 15, Ohio
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FEBRUARY, 1956

Plant Engineering

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